Consultative Committee for Space Data Systems

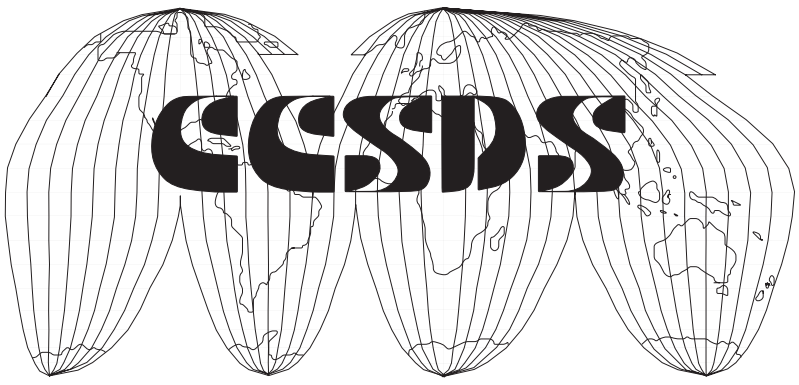
DRAFT REPORT OF THE MANAGEMENT COUNCIL

CCSDS MANAGEMENT COUNCIL MEETING MINUTES

CCSDS B10.0-Y-19

DRAFT YELLOW BOOK

December 1999



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BNSC	Mr. Peter A. Vaughan,
	Dr. Peter Allan
CNES	Mr. Roland Ivarnez
	Mr. Jean Latour
CSA	Mr. Arvind Bastikar
DLR	Dr. Hubertus Wanke
ESA	Dr. Carlo Mazza
INPE	Dr. Eduardo W. Bergamini
NASA	Mr. David L. Townley
NASDA	Mr. Hideo Hara
RSA	Mr. Vladimir Starostin

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USGS	Mr. Tom Kalvelage

Panel/Subpanel Chairmen

P1		Dr. K. Lenhart (ESA / ESOC)
	P1A	Mr. M. MacMedan (NASA / JPL)
	P1E	Mr. Jean Luc Gerner (ESTEC / ESA)
	P1F	Mr. A. Hooke (NASA / JPL)
	P1J	Mr. Felipe Flores-Amaya (NASA / GSFC)
P2		Dr. David Giaretta (BNSC / RAL)
		Mr. Nestor Peccia (ESA)
		Mr. D. Sawyer (NASA / GSFC)
P3		Mr. Maurice Winterholer (CNES)
		Mr. J. Kaufeler (ESA / ESOC)
		Dr. H. Uhrig (ESA / ESOC)

Information

Mr. G. Delmas (ESA / ESOC)
Mr. M. Drexler (DLR / GSOC)
Mr. W. Poland, Jr. (NASA / GSFC)
Mr. R. Stephens (QSS)
Mr. T. Gannett (GST)

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SUBJECT: Minutes of the Consultative Committee for Space Data Systems (CCSDS) Management Council (MC) Meeting

PLACE: Frascati, Italy

DATE: December 13-14, 1999

I. ATTENDANCE

Organization	Name
ASI	Mauro Donati
BNSC / RAL	Peter Vaughan Peter Allan David Giaretta
CASI / CAST	Quan Xiaolian Zhang Zhao Yan Hou Shen Yuan
CNES	Roland Ivarnez Jean Latour MauriceWinterholer
CSA	Arvind Bastikar
DLR	Hubertus Wanke Manfred Drexler
ESA	Carlo Mazza Klaus Lenhart
INPE	Eduardo Bergamini
NASA	David Townley Adrian Hooke Robert Stephens Tom Gannett
NASDA	Hideo Hara

II. INTRODUCTION

The meeting was convened by Mr. David Townley, CCSDS Chairman, at 0830 hours on 13 December, 1999.

Following the call to order, the delegates and other attendees introduced themselves.

III. WELCOMING REMARKS

On behalf of the ESA and NASA, Mr. Townley welcomed all of the attendees

IV. AGENDA REVIEW AND APPROVAL

There were some slight alterations made in the order of items shown in the original draft agenda to accommodate various attendees' personnel schedules. Additionally, Dr. Mazza wished to add a discussion of the Object Management Group (OMG) Initiative under tem 11, Special Topics. The agenda was then approved.

The final agenda is shown in Attachment A.

V. REVIEW OF MINUTES FROM LONG BEACH, CALIFORNIA

The minutes from the Spring 1999 meeting in California had been previously distributed and no comments had been received. The minutes from the Spring 1999 meeting were then approved. In response to a question from Dr. Lenhart, it was reported that future meeting minutes would be distributed only in electronic form unless specifically requested. There was discussion as to whether these should be available to the public by linking them from the Home Page or whether their distribution should be semi-controlled by identifying them with a unique URL. It was noted that the minutes from the Spring 1999 meeting were not on the Web and the Secretariat was assigned an action to determine what happened and to rectify this omission.

VI. SECRETARIAT REPORT

The Secretariat’s report had been previously distributed to all members. At the Spring 1999 meeting, it had been decided to provide the register and directories of the CCSDS Member Agencies, Observer Agencies, and Associates via Web posting on the CCSDS Home Page. Therefore, this report included only the list of open action items and a list of CCSDS Documents' status. The Open Action Item status is discussed below under item 7.

An updated list of CCSDS documents' status was distributed and discussed at the meeting. It is Attachment B to these minutes.

VII. REVIEW AND REPORT OF OPEN ACTION ITEMS

Prior to the meeting, the Secretariat had suggested, in the interest of time, that only the open action items from past meetings be discussed. The MC agreed with that suggestion. Comments made relative to these Open items are included below. By MC Resolution, some of the "continuing" Action Items were withdrawn and the Secretariat directed to maintain a list of pending items and issue periodic reminders to the Member Agency Head of Delegations.

Status of Open MC Action Items (from spring 1999 meeting)

98-6. The TSG shall develop a template for the panel reports to the MC that differentiates between active and inactive items in the work program, shows changes since the last report, panel document status, the schedule for the work, and any issues impacting panel production.

Assignee: TSG Chair
Due Date: Next MC Meeting

Status: Closed: Dr. Lenhart described a proposed outline of the contents for this document. Included would be the status of work in progress, resolutions and Conclusions/Issues. It will be completed and distributed for final comments. Mr. Winterholer suggested that documents and their schedules should be included. There should also be an indication of specific different accomplishments or something specific or a breakthrough which would serve as Selling Points in the program.

Dr. Lenhart noted that the TSG had made a resolution to approve this format when reporting to the MC.

Mr. Gannett noted that the work breakdown structures will use the P3 format and P2 had agreed; the P1 work breakdown structures will have to go into two pages.

A Resolution was made to accept this outline and to direct Panel Chairmen to use this format when reporting to the MC in the future.

This Template is Attachment C to these minutes.

99-1. Provide comments to Secretariat and Panel Chairmen on the P2 procedures with regard to processing non-CCSDS / external standards (included below).

Assignee: MC Members
Due Date: July 15

Status: Closed: This subject was discussed at length and an Action taken for the Secretariat to draft some appropriate wording for a CCSDS Procedures Manual relative to Maintenance Procedures. This draft is to be distributed for comment, and when approved, will be introduced into the CCSDS Procedures manual.

99-18. Provide recommendations and supporting information about new activities to be included in the CCSDS site under "It's Hot."

Assigned to: Panel Chairmen
Due Date: Continuing action

Status: Closed: Nothing had been submitted and the MC accepted the Secretariat's recommendation that this item be withdrawn. It was reported that the Hot button re documents is in progress.

99-25. Document editors and the respective panel chairmen shall determine when a Green Book can provide useful information and is, therefore, ready for release.

Assignee: Appropriate Document Editor and Panel Chairman
Due Date: As appropriate

Status: Closed: No responses had been received and the MC accepted the Secretariat's recommendation that this be made a Resolution and the Procedures Manual be changed appropriately.

NASA HQ has been ISO 9000 Certified which requires an approach to action items which are not resolved

There was extended discussion as to how we could make the CCSDS and ISO reviews run concurrently.

There was no comment regarding the Secretariat’s recommendation to withdraw certain action items.

VIII. AGENCY REPORTS

ASI. Mr. Donati reported that his agency is involved in interoperability and standards work. Being new to this activity he did not currently have a lot of background and therefore did not have any comments to make. He did indicate that ASI expects to become involved with the CCSDS work.

Mr. Donati did not provide a written report.

BNSC. Mr. Vaughn gave this report. He noted that Dr. Allan has replaced him as the BNSC principal delegate. He stated that within the UK, CCSDS recommendations and their associated ISO and British Standards Institute (BSi) standards continue to grow in importance within the BNSC programs. BNSC maintains its support to the CCSDS Panels, the TSG and the MC. Overall BNSC staff levels for this work are around 2 staff years per year with additional resources via a contract with Vega to prototype SLE services within the UK STRV program. He listed the individual items which BNSC supported and those which priority is being given, the meetings and conferences at which BNSC attended or provided papers for, and the CCSDS-compatible spacecraft for which their RAL S-band station provided support.

Mr. Vaughn's report is Attachment D to these minutes.

CSA. Mr. Bastikar reported on their activities. He noted that CCSDS standards are being adopted by MOS-1; others missions have also adopted CCSDS Recommendations. He stated that CEOS is leaning towards CCSDS standards and a fourth mission is still being analyzed re the use of CCSDS recommendations. He stated that the planned CSA Test Bed is half funded.

Mr. Bastikar did not submit a written report.

CNES. Mr Ivernez gave this report. CNES finds CCSDS important to their programs with many new satellites adopting CCSDS Recommendations which he named. A momentum has been developed and "CCSDS-compatible" is the general rule within this agency. He described CNES's involvement in panels, including chairmanship of P3. They are also active with P2. He has not had too much success in identifying French companies building CCSDS compatible components. With regard to their activity within the ECSS the CNES representative has said that they would only work on management and quality but not on technical engineering development. This is a matter of resources. He announced the retirement of Mr. Latour who is the current chairman of ISO/TC20/SC13. (He was asked to provide the level of CNES manpower working on CCSDS.)

Mr. Ivernez's report is Attachment E to these minutes.

DLR. Dr Wanke provided this report. He stated that DLR's emphasis is on P3 and P1J and their manpower levels are about the same. He had provided some comments relative to including the amount of manpower from each agency in the CCSDS Strategic Plan (CSP). He is not sure of the intention of the CSP. (Mr. Townley indicated that he felt the CSP information should flow down to the COP and then down to the Panels.) Dr. Wanke felt that a Purpose statement should be added to the CCSDS Operating Plan (COP) (which he provided later in the meeting). He described DLR's involvement in P1 especially in P1J. He expressed some concerns about the P1J work. (Dr. Lenhart indicated that there had been a P1J meeting the previous week and all the DLR concerns were addressed in the agree-to document.) DLR also provides a monitoring role in the rest of P1 and P2 and are working in P3 extensively. They plan to implement some of the SLE services as part of their modernization effort within the next two years. He also itemized the projects (both planned and those already in operation) that are using CCSDS Recommendations. DLR also has a prime responsibility in developing some API.

Dr. Wanke's presentation is Attachment F to these minutes

ESA. Dr; Lenhart gave this report. He noted that panel meetings were generally held on ESA facilities. This resulted in better attendance and good technical progress being made. The Interoperability Plenary (IP) meeting was held in Europe with a great deal of high level participation. This was seen as a major breakthrough with a lot of high level management involvement and acceptance of CCSDS. ESA has started an internal promotion process of CCSDS which has resulted in a document/brochure which describes many of the CCSDS Recommendations. (A few copies were distributed at the meeting and more are available upon request.) A presentation was made to the ESA Engineering Structures Board and the recommendation made to include all CCSDS Recommendations of interest to ESA in the ECSS stack of standards. (The question was asked if this would mean that there will be two different numbers to a given CCSDS standard. ESA is seen as having considerable influence within ECCS and will try to insure that will not be the solution. They will point to ISO/CCSDS documents within their stable.)

An action was assigned to Dr. Lenhart to explore/recommend a procedure whereby ECSS adopts "as is" the CCSDS Recommendations especially those which are ISO standards. He will propose they refer to the ISO numbers and they be registered as ISO standards.

Dr. Mazza outlined ESA's continued effort within CCSDS, noting that more than 15 agency people work on the development effort with perhaps 6-7 more on implementation of CCSDS standards. He reported a favorable shifting in the ESA relative to CCSDS over that which existed during the time of the Spring 99 meeting.

ESA will be implementing SLE for Integral and other facilities at about $1.5M being spent on this implementation. Concern was expressed that we are facing

challenges from the mobile services in that they are crowding the space work out of given frequency bands. He noted that a P1E Resolution will be given during the Panel Reports re efficient modulation. He noted that there is a problem with this Recommendation in that one of the schemes is patented by a company associated closely with JPL. Of interest is that ESA's Control Authority has been expanded.

Dr. Lenhard's presentation is Attachment G to these minutes.

INPE. Dr. Bergamini gave this report. He stated that INPE is making progress with specific projects and the Alcantara Space Launch Center in Sao Luiz. He listed the CCSDS Recommendations which are being translated into Portuguese. He also indicated that more people are being assigned to the standards work.

INPE again extended its invitation to host the MC+SC13 meetings in the Fall of 2000 at INPE, in Sao Jose dos Campos, in the same dates of 28 - 29 Nov., as established, in Frascati.

Dr. Bergamini's report is Attachment H to these minutes.

NASA. Mr. Hooke gave this report. He mentioned changes in the Headquarters organization, in particular the appointment of Mr. Robert Spearing as Director of Space Communications. This change is seen as beneficial to our organization since provision is being made for a closer relationship with CCSDS. He noted that the number of CCSDS-Compatible spacecraft keeps increasing. The Interplanetary Internet implementation is going well and getting large support. We are seen as being in a good position to influence this activity in that we have formed new relationships with Internet development groups which are making some resources available. An international InterPlanetary Network (IPN) Research Group (IPNRG) has been formed; CNES will be one co-chair with NASA being the other. Mr. Hooke is trying to enhance CCSDS's presence in this activity which is seen as a good opportunity for our getting more exposure. The IP Advisory Group will represent the customer of the CCSDS activity. The ITC in October 1999 was very successful from the CCSDS standpoint.

Mr. Hooke's report is Attachment I to these minutes

NASDA. Mr. Hara gave this report. He described their involvement in the CCSDS Panels. There are a significant number of NASDA employees working within CCSDS including some contractors. He listed and described the space and ground activities which are implementing CCSDS Recommendations.

Mr. Hara's report is Attachment J to these minutes.

RSA. Mr Starostin was unable to come to the meeting personally. However, he did provide a written report describing CCSDS-related activities within Russia. He

noted the increase in Russian participation in CCSDS-related activities as well as their plans to participate to an even greater extent in the future.

Mr. Starostin's report is Attachment K to these minutes.

IX. SPECIAL TOPICS

CCSDS Strategic Plan and CCSDS Operating Plan

The CCSDS Strategic Plan, Version 5 was approved without change and signed by seven of the nine Agency Heads of Delegation. The Secretariat is in the process of obtaining signatures from the two delegates who were not in attendance.

The CSP is Attachment L to these minutes.

The CCSDS Operating Plan was also presented for approval. At the suggestion of the DLR delegation, an introductory statement of Purpose and Scope was added at the beginning of Draft 5, and Draft 5.1 was produced at the meeting. Draft 5.1 was approved by resolution with the understanding that a few additional Panel 3 comments, which the editor had not seen prior to the meeting, would be incorporated into the Themes tables. It was agreed also that a change control page would be added to the document. As soon as the final changes have been made, the approved version will be made available electronically.

The COP is Attachment M to these minutes.

Interplanetary Internet

Mr Hooke indicated that this activity has a long range output and probably a different communications architecture. Commercialization of Space Activity will be the driver in the future. There is a need to look at a common around-the-earth architecture for the present. This is in transition and we must make sure there is nothing in the current architecture which would inhibit its being replicated around the planets. Today's architecture is based on copper and fiber optics which is interoperated on a continuous connection. We are moving towards a more symmetric system which is highly mobile as people travel extensively. The current Internet architecture is NOT configured to handle this mobility well. The connectivity has to be fairly clean. He explained the edge-market. Bandwidth and latency are limitations today. He described the environment of tomorrow. A class of problems is evident which affects many of the environments today. Servers will be self solving and become independent of today's environment. Similar problems obtain within each involvement. He showed a proposed approach to the solution. We need to coordinate the two environments. He described the Internet organization:

The Internet Society (ISOC) facilitates open development of standards and protocols, supports education in developing countries, promotes professional development and fosters an environment for international cooperation

The Internet Engineering Steering Group (OESG) is responsible for technical management of IETF activities

The Internet Research Task Force (IRTF) works on topics related to Internet protocols and applications. This is a relatively closed activity and this is where the Internet future is shaped.

The Internet Engineering Task Force (IETF) is a large open international community concerned with the evolution of the Internet architecture.e noted that this activity is funded by DARPA, NASA and their projects and new Special Interest groups. Mr. Hooke would like to integrate some of these international activities. He showed a simple architecture and feels we can leverage off the Internet.. He also noted that there is only a small activity related to Security. He indicated that we need to get together with the Internet; Dr. Lenhart sees our getting involved. The agencies need to decide what the future benefits are to themselves. They then have to decide what resources they will make available. Dr. Mazza is concerned about how we can stay abreast of all the changes that can be anticipated in the next few years in technology. Mr. Hooke indicated that NASA is being plagued with people who want to abandon CCSDS and use straight TCP-IP. Some concern was expressed over spreading our resources to include all these activities. Mr. Townley indicted that different agencies have different levels of interest and different pressures to use commercial protocols. Some feel that we should be working the nearer term problems and leave the far-future for later.

Mr. Hooke's presentation is Attachment N to these minutes.

Object Management Group Request for Information

Dr. Mazza reported on a request received by ESA from the Farmingham Corporate Center which is a large consortium of software companies. The group does not appear to be very knowledgeable of our activity. This request needs to be studied. There seems to be a perception that our work and their work is running somewhat in parallel.

The question was raised whether we need to establish an interface with this group. Mr. Townley suggested we need to do some exploratory work. An action was taken for the Secretariat to (1) develop a "CCSDS" response to the OMG management suggesting some coordination efforts be undertake between them and ourselves and (2) to develop an "individual agency" report for each agency to respond to the OMG RFI. It was noted that this RFI response is due by February 2000.

The OMG Request of Information (RFI) is Attachment O to these minutes.

The Secretariat will distribute a brief report by a Mr. John Pietras who attended a recent OMG meeting on behalf of P3.

Interoperability Plenary Report

This report had been provided as part of the Secretariat's report and in the interest of time, Mr. Townley elected not to review it during the meeting. However, it was noted that there had been a strong statement of support for the CCSDS by the NASA delegare, Mr. R. Spearing

UN Meeting on Peaceful Uses of Outer Space

One or two of the MC members had attended the meeting which was oriented to helping developing countries become more involved in space activities. Dr. Lenhart had given a paper on CCSDS' open standard formats..

X. PANEL REPORTS

Panel 1. Dr. Lenhart provided the Panel 1 Report. He gave a meeting schedule, the state of activities, some of the Resolutions and some issues for the MC.

His presentation is Attachment P to these minutes.

- P1A. There had been a lot of agreements reached during the P1A meeting in October: efficient codes for bandwidth-constrained environments, lossy data compression, restructuring of P1 books , and the Proximity Link Red Book development.
- P1E. Dr. Lenhart explained the pending problems regarding congestion in the frequency bands presently allocated for space work. It is becoming necessary that we vacate our lower bands. He requested that the MC approve the release of a P1E Recommendation (Pink pages) for Member Agency review. Basically it called for the use of either GMSK or FQPSK (pending granting of a free license) be used for high data rate transmissions whenever practicable and in any case for rates in excess of 2 Mb/s where the available bandwidth is limited." The bands for which this recommendation is applicable are seen as two (2) and eight (8) Gh/z for now and for K-band later. Since there was some reservation by two Members, an action was established for NASDA and CNES to look at the provisions of this draft Recommendation and to assess its impact on their respective agencies. They are to report back to Dr. Lenhart via e-mail by the end of January.
- The P1E Recommendation is Attachment Q to these minutes.
- Dr. Lenhart also mentioned that optical communications is being studied by sub-panels 1A and 1E.

– Panel 1F was working on the CCSDS File Delivery Protocol (CFDP), four (4) SCPS BBs and the SCPS GB.

– Panel 1J was reported as having made good progress. He felt they would be issuing a draft GB in the near future. They are also working on defining " navigation format data" The total program is being adversely impacted for several reasons mentioned by Dr. Lenhart.

– Dr. Lenhart showed as Issues for the MC:

  • Lack of continuity concerning the attendance of experts in Technical Panel meetings,
  • Frequency band congestion requires considerable effort,
  • Need to support IP protocols over space link (In an effort to resolve this, CCSDS is considering use of STRV-2 in flight testing. Money is now available to conduct these tests.)

– Spacecraft On-Board Interfaces (SOIF)

  Dr. Lenhart noted that this is a new Working Group directed at on-board interfaces. This group started work in the summer of 1999. They held their first international meeting earlier in December. There was good participation by both the agencies and their contractors. There was also a schedule of the meetings developed. - The ESOC chairman has done a good job of putting things on the Web. They had agreed that the first need was a Reference Model and the two (Europe and US) proposed models were surprisingly alike. He described the NASA-proposed architecture. There is an electromechanical interface, electronic interfaces for three Spacecraft buses and three application service interfaces (APIs). TCP/IP for onboard usage is perfectly agreeable with these protocols being carried over CCSDS protocols. This architecture was accepted as a “going-in” position. He explained the two-year schedule for developing four Blue Books for use by spacecraft in the later half of the next year. They will hold the Red Book for testing for some period before going Blue. The power interface was generally agreed to as including three different levels of 5, 12 and 100 volts. He then showed a template of the three bus-speed proposal. In this area, there was acceptance reached for these buses and some of the existing protocols. Within Europe, ESA’s low speed link protocols were adopted.

  The following recommendations regarding the SOIF were made:

  • Continue to charter SOIF Working Group
  • Agencies to convert it to a NWI
  • Decide whether to coordinate with SC-14 on
    POWER
    ELECTROMECHANICAL (PLUG, PIN, MOUNTING)
    ENVIRONMENT (Thermal, Radiation, UV Radiation

An Action was taken to direct the SOIF to develop a statement of work for the electromechanical and environment interfaces and to initiate coordinatiion withSC14 to explore options for addressing this work.

PANEL 2. Dr. Giaretta reported on this area. He showed the P2 Work Breakdown Structure and its division into Research, Development and Deployment areas. He also presented the P2 Roadmap and the Document tree which includes software efforts. He reported on the document status. Not too many RIDs have yet been received against OAISRB. P2 plans to request an extension to the CCSDS review to make it more in consonance with the ISO review process. The organization of P2 has not changed. He then showed the progress of the document development and showed accomplishments in the areas of OAIS RB, the DEDSL RBs. He reported that an abstract for the Space Op 2000 has been submitted and also for the IAF-2000 abstracts and for the Open Metadata Registries forum in Jan 2000 in Santa Fe. He also listed the growing use of the EAST Recommendation as is the usage of SFDUs and the OAIS Reference Model.

He reviewed the meeting schedule showing the P2 IWS being held on May 4-12 with location possible at Ames, California.

He presented P2 Resoutions as:

- OAIS Agency review be extended to end with the ISO Review,
- The Data Entity DictinarySpecficatio Language – Abstract Syntax be published as a Red Book,
- The PVL Concrete Syntax be published as A RB when ready,
- The EAST Extension - Pink pages - be published when ready,

He stated an ISSUE as how to best leverage CCSDS efforts in Archive work outside the space agencies like using XML for metadata and more.

He noted that the P2 Control Procedures are seen as applicable to the Global Information Infrastructures. He reported that P2 is attempting to bring in resources on Archives from non-Space areas

Dr. Giaretta's presentation is Attachment R to these minutes.

PANEL 3. Mr. Winterholer reported on this area. He felt that excellent progress has been made during the recent P3 meeting. He petitioned the MC to release the SLE Service Management as a RB and a Resolution was taken to that effect. He showed his book schedule and indicated that he does not plan to develop any other SLE books than those shown. He noted slight changes in the Panel objectives and in the P3 organization.

Mr. Winterhoker's presentation it Attachment S to these minutes.

TSG Report. Dr. Lenhart gave this report. He noted that the minutes of the October TSG meeting have been distributed via e-mail. It was noted that the MC agrees that its meeting minutes are to be in electronic form only and made available on the server. They are to be put on the same server with the MC minutes whereas the panels keep their records on their own servers. He reviewed the TSG meeting agenda which had included the naming WG report, the Interplanetary Internet, security and SOIF subjects.

- Security: There is a Hacker News Web page which announces an attack on satellites and refers to CCSDS. Future BBs should not be approved without security analysis. Mr. Bastikar suggested a policy statement regarding Security be issued by the MC since national Policies exist in many Agency's country. The Security group is being looked to for some guidance and NASA is supporting the continuation of the work. Other agencies are encouraged to do the same. ESA is looking into continued support by Mr. Nick Shave. A Resolution was made to continue this work , to request a plan from the security working group as to how this work should be continued in the future, and that each member agency seek to continue support for this security effort.

- Naming and Addressing: A Yellow Book, showing the naming format has been written. It was reported to be draft Yellow Book: CCSDS-A30.0-Y-0.1 or later. It was noted that number assignment has already been taken. Another will be assigned. Dr. Lenhart then showed the organizational structure of a name. There was discussion as to the need to establish a control mechanism to register the P3 (and other) names once they have been generated. The P2 system might be applicable but the CAP BB would have to be modified. The Secretariat was asked to publish the Name Space Value in the minutes.

- Secretariat's Addition:

  Example of "unique name" (given that it is in an ISO context):

  1.3.112.4.2.NSSD0123

  Name Space Identifier Name Space Title
  1 ISO
  3 ISO 6523 Organization Identifiers It indicates that a
  name space has been reserved for CCSDS
  112 ISO JTC1/SC 32 Identifiers
  4 CCSDS Name Space Identifiers
  1 Control Authority Procedures Registration Authority Identifiers
  or
  2 Control Authority Procedures Authority and Description Identifiers
  or
  3 Link Space Extension Services Identifiers

NSSD A CCSDS Assigned Control Authority
0123 A CCSDS Control Authority Assigned Instance of an Item

An Action was taken for each panel to review the Yellow Book and determine its next course of action.

– Onboard Navigation : It was reported that several GPS-type spacecraft now exist for this onboard navigation interface. (In this instance "GPS" stands for any/all navigation satellites.) There is a need for coordination between SOIF and P1J to determine requirements. The GPS provides a way of correlating spacecraft clocks. On board navigation should be a high priority, including Onboard attitude determination. The question was asked as to how the data is handled.

  A Resolution was made that each agency look at the P1J effort from its own aspects and make comments as to the directions P1J should take.

Dr. Lenhart's presentation is Attachment T to these minutes.

XI. DISCUSSION OF NEXT MEETINGS

IAF: At the Spring 99 meeting, Dr Bergamini had asked for names of papers for the IAF 2000. (Dr. Bergamini noted that the invitation for presentation of CCSDS papers to the IAF-2000 Congress came specifically from the part of the IAF Space Exploration Committee which organizes its corresponding Symposium, in the IAF Congress.) Not enough papers have been submitted to date to warrant a separate session on standards, but there still is an opportunity to hold a session on space standards. Alternately, we can provide one paper for each session if it matches the thrust of that session. (There are five sessions.) Mr. Hooke and Dr. Giaretta have offered to provide papers on the Interplanetary Internet and Faster, Better Data respectively. There could possibly would be one from P3. Travel money shortages will be a limitation. ESA budget limitations will almost certainly preclude ESA's attending a meeting in Brazil but Dr. Mazza felt it was important that an ESA paper be provided. Diversity of representation for the IAF meeting is desired although more papers are certainly welcome. There had been a past agreement that we should raise the perspective of CCSDS to higher (profile) management. IAF is an opportunity in this context. Dr. Mazza suggested we cover all the CCSDS basis, like the panels. Chairmen are encouraged to examine their areas of responsibility and the MC strongly suggests papers to be given. The question was asked if any P2 papers fit into the session themes. There still is an opportunity to hold a session. The IAF committee is receptive to CCSDS papers but abstracts are due in February 2000. The IAF2000 Web-Site needs to be upgraded.

XII. SC14 STATUS

Mr. Bastikar reported that he had attended an SC14 meeting last week and the next meeting is in June 2000, in London. One standard, ISO DIS 14711, "Mission Operations" is being forwarded to ISO for progressing to an international standard.

XIII. PLANNING FOR NEXT SET OF MEETINGS

The following meeting schedule was developed for the next two years

– Summer of 2000

The TSG/MC/SC13 meetings are set for 26-28 June, 2000 in Toulouse with the individual meeting dates of:

- TSG - 26 June, 2000,
- MC - 27-28 (AM) June, 2000,
- SC13 – 28 (PM) June, 2000.

It will, however, be necessary to coordinate our dates with a planned Internet meeting.

- Panels 1 and 2 will meet in May in US.
- P3 will meet in June in Toulouse.

– Fall of 2000

The IAF-2000 is 2-6 October in Brazil.

This is too soon after the Summer meeting which will be in late June and the summer vacations intervene.

What is a viable location to Brazil since travel costs to that location are deemed high? It will be in the US (probably in the US East Coast). The dates were set for November 28/29, 2000, since the TSG will not be meeting with the MC this time

P2 will met early in November.

All this will be reaffirmed in the Summer 2000 meeting.

– Spring of 2001

This meeting will be in the UK, most likely in mid-May.

All three groups will meet: TSG. MC, and SC13.

This too will be finalized at a later date.

XIV. RECOGNITIONS

Before adjourning, the MC noted the service and contributions to the CCSDS program which had been made by two members who were retiring, namely Mr. Peter Vaughn and Mr. Jean Latour. Resolutions were taken to express the MC's appreciation to these two fine gentlemen.

The meeting was adjourned at approximately 1200 noon.

ACTION ITEMS
CCSDS Management Council Meeting
13-14 December 1999
ESRIN, Italy

The following actions were developed during the Fall 1999 MC meeting:

MC-F99-A1 Provide an Organization Chart for CCSDS and include the names and addresses of the managers.

Actionee: Secretariat
Due Date: 15 Feb. , 2000

MC-F99-A2 Post the S99 MC minutes on the Web.

Actionee: Secretariat
Due Date: 15 Feb. , 2000

MC-F99-A3 Develop and circulate for approval, text regarding a procedure for maintaining Recommendations which were developed initially external to CCSDS but had been submitted to ISO through the CCSDS. This procedure shall in no way subvert the existing CCSDS MC approval process. This maintenance procedure, when approved by the MC will be incorporated into the CCSDS Procedures Manual.

Actionee: Secretariat
Due Date: 15 Feb. , 2000

MC-F99-A4 Determine how the European Cooperation for Space Standardization (ECSS) will number those CCSDS Recommendations which it adopts without alteration, especially those which have been progressed to ISO International Standard status.

Actionee: Dr. Lenhart
Due Date: June 2000 MC meeting

MC-F99-A5 With the InterPlanetary Network (IPN) co-chairman, schedule the first meeting of the IPN Research Seminar series to be in the same general time period (June 2000) as the Space Ops 2000 in Toulouse.

Actionee: A. Hooke
Due Date: As soon as possible

MC-F99-A6 Look into meeting opportunities with Internet Engineering Task Force (IETF) and determine what the benefits are of such a series.

Actionee: Secretariat
Due Date: 01 March, 2000

MC-F99-A7 Develop a CCSDS response to the Object Management Group's (OMG) Request for Information (RFI).

Actionee: Secretariat
Due Date: 15, January, 2000

MC-F99-A8 Develop an Agency response to the OMG's Request for Information (RFI) and circulate for individual's transmittal to OMG.

Actionee: Secretariat
Due Date: 15, January, 2000

MC-F99-A9 Provide comments re the acceptability of P1E's Recommendation relative to "Modulation Methods at High Symbol Rate Transmissions. "

Actionee: NASDA and CNES
Due Date: 15 January, 2000

MC-F99-A10 Conduct a voting poll by e-mail of the Member Agency Head of Delegations as to the release of P1E's Recommendation relative to "Modulation Methods at High Symbol Rate Transmissions" as Pink Sheets for official Member Agency review.

Actionee: Secretariat
Due Date: 01 February 2000

MC-F99-A11 Develop a statement of work relative to onboard electrical interfaces for consideration by SC-14.

Actionee: Dr. Lenhart
Due Date: Spring 2000 MC meeting

MC-F99-A12 Notify CCSDS Member Agencies that the OAIS RB review has been extended until mid-2000 to coincide with the ISO review of this document.

Actionee: Secretariat
Due Date: 01 February, 2000

MC-F99-A13 Check the status of BB on Modulation which should have been sent to SC-13 for progressing to an IS.

Actionee: Secretariat
Due Date: 01 February, 2000

MC-F99-A14 Assign a number to the Naming Conventions Yellow Book inasmuch as the suggested number has already been assigned to a different document.

Actionee: Secretariat
Due Date: 01 February, 2000

MC-F99-A15 Review the Naming Yellow Book as presented by Dr. Lenhart and determine the next course of action for each panel with regard to this procedure.

Actionee: Panel Chairmen
Due Date: Spring 2000 meeting

MC-F99-A16 Compile a list of URLs issued by the several CCSDS organizational elements.

Actionee: Secretariat
Due Date: 01 March, 2000

MC-F99-A17 Issue another call for papers for the IAF 2000 meeting in Brazil.

Actionee: Secretariat
Due Date: 15 January, 2000 (Abstracts are due in February 2000)

MC-F99-A18 Distribute a brief report by a Mr. John Pietras who attended a recent OMG meeting on behalf of P3.

Actionee: Secretariat
Due Date: 15 February, 2000

NOTE – THE FOLLOWING ACTION, MC-F99-A19, HAS BEEN ADDED TO THE MEETING MINUTES WITH THE CONSENT OF THE MC TO BETTER REFLECT THE STATUS OF THE P1E RED BOOK ON "EFFICIENT MODULATIONS AT HIGH SYMBOL RATES TRANSMISSIONS."

MC-F99-A19 With respect to the P1 proposed RED BOOK, "3.3.5A, Efficient Modulations at High Symbol Rates Transmissions, Space Research, Space-to-Space, Category A1," Agency Heads of Delegation should:

(a) Address technical questions on this book through their Panel 1 technical representatives;

Actionee: Agency Head of Delegation
Due Date: 15 April, 2000

(b) Identify programmatic issues and suggest topics for discussion at the Spring 2000 Management Council meeting.

Actionee: Agency Head of Delegation
Due Date: 15 May, 2000

RESOLUTIONS
CCSDS Management Council Meeting
13-14 December 1999
ESRIN, Italy

MC-F99-R1 CCSDS resolves to approve the format presented by the TSG chairman and directs that it be used by Panel chairmen when making their Panel reports to the MC.

MC-F99-R2 CCSDS resolves that all action items of a 'Continuing' nature be replaced by a list of such responsibilities maintained by the secretariat and periodically distributed to Agency Head of Delegations as a reminder of these responsibilities.

MC-F99-R3 CCSDS resolves to establish a liaison relationship with the Internet SOCiety (ISOC) and to appoint Mr. Adrian Hooke as its liaison representative to that organization. CCSDS further resolves that each Member Agency be encouraged to join the activities of the IPN Research Group and to determine to what extent it can support this activity.

MC-F99-R4 CCSDS resolves to conduct a series of international InterPlanetary Network (IPN) Research Seminar series with the first such seminar to be scheduled for June 2000 in Toulouse, France in consonance with the SpaceOps 2000.

MC-F99-R5 CCSDS resolves to adopt the CCSDS Strategic Plan Version 5.1 and to obtain signatures from those Member Agency Head of Delegations who were not present at this meeting.

MC-F99-R6 CCSDS resolves to adopt the CCSDS Operating Plan, Version 5 with the understanding that a few additional Panel 3 comments will be made to the Themes tables and a change control page will be added to the document.

MC-F99-R7 CCSDS resolves to consider synchronizing occasional CCSDS and IETF meeting schedules and location to encourage greater participation of CCSDS personnel in Internet activities.

MC-F99-R8 CCSDS resolves to extend the CCSDS / Agency review of the OAIS RB until the ISO review of the OAIS as a DIS (approximately mid-2000)

MC-F99-R9 CCSDS resolves to publish the Data Entity Dictionary Specification Language (DEDSL) – Abstract Syntax as a Red Book for official agency review.

MC-F99-R10 CCSDS resolves to publish the Data Entity Dictionary Specification Language (DEDSL) – Concrete Syntax as a Red Book when ready for official agency review. This document is to be given a new number inasmuch as a previous DEDSL RB has been withdrawn.

MC-F99-R11 CCSDS resolves to publish EAST Extension Pink Pages when ready for official agency review

MC-F99-R12 CCSDS resolves to publish the Data Entity Dictionary Specification Language (DEDSL) – XML Syntax when ready as a RB for official agency review

MC-F99-R13 CCSDS resolves to publish SLE Service Management as a RB for official agency

MC-F99-R14 CCSDS resolves to defer approval of the proposed RED BOOK, "3.3.5A, Efficient Modulations at High

Symbol Rates Transmissions, Space Research, Space-to-Space, Category A1," pending disposition of technical questions

and Agency programmatic issues related thereto.

Note: This Resolution has been changed as shown from the original working which erroneously anticipated acceptance of the draft Recommendation by CNES and NASDA.

MC-F99-R15 CCSDS resolves to continue its work in Security and requests Member agencies to develop a plan as to how this work is to conducted in the future and to determine how they can financially support the work

MC-F99-R16 CCSDS resolves that each Member Agency look at the P1J effort from its own aspects and make comments as to the directions P1J should take and what resources can be made available

MC-F99-R17 CCSDS resolves that, in view of the opportunity to promote CCSDS at the IAF2000 meeting in October 2000 in Brazil, each agency and panel should investigate the possibility of preparing papers for presentation in Brazil which are applicable to both their respective activities and the IAF goals.

MC-F99-R18 CCSDS resolves that:

- Whereas the CCSDS Procedures Manual Currently Describes a Green Book as a Technical Report, and
- Whereas Drafts of Green Books are Permitted (Section 5.2.2) to be Distributed,

Document editors and the respective panel chairmen shall determine when a Green Book can provide useful Information and is, therefore, ready for release. (Necessary changes will be made to the Procedures Manual).

MC-F99-R19 CCSDS resolves to thank Mr. Peter Vaughn for his years of dedicated service to the CCSDS program and to wish him every success in his future endeavors.

MC-F99-R20 CCSDS resolves to thank Mr. Jean Latour for his contributions to the Space Data Standards program in general and to the CCSDS program in particular and to wish him every success in his future endeavors.

MC-F99-21. CCSDS resolves to accept the proposal of the French Space Agency (CNES) to host the Spring 2000 MC meeting in Toulouse, France on 27-28 June, 2000. The TSG will also be hosted there on 26 June, 2000. The individual panel meetings will be scheduled separately at dates and locations to be determined.

MC-F99-22 CCSDS resolves to accept the proposal of the National Aeronautics and Space Administration (NASA) to host the Fall 2000 MC meeting in TBD United States on 28-29 November, 2000. The TSG and the individual technical panels will be scheduled separately at dates and locations to be determined. Meanwhile, INPE is still holding open its offer to host the Fall 2000 meeting in Brazil. A final decision will be made at the Toulouse meeting in June 2000.

MC-F99-23. CCSDS resolves to accept the proposal of the British National Space Center (BNSC) to host the Spring 2000 MC meeting in the United Kingdom with dates and location to be determined

MC-F99-24. CCSDS resolves to thank the ESA and ESRIN organizations for the gracious hospitality shown to us during this MC meeting and for the delicious buffet provided to the participants

ATTACHMENT A

AGENDA AND STATUS OF ACTION ITEMS

AGENDA
CCSDS MANAGEMENT COUNCIL
ESRIN
Frascati, Italy
December 13-14, 1999

0. Pre MC Meeting: CSP / COP Discussion (08:30 AM)

1. Call to Order (10:30 AM)

2. Introduction of Delegates

3. Welcoming Remarks

4. Agenda Review and Approval

5. Review of Minutes from Spring '99 Meeting, Newport Beach, California

6. Secretariat Report

7. Review and Report of Open Action Items

8. Agency Reports
   (Include ManYears of effort and potential resource issues)

9. Summary Reports from Technical Panels
   - Panel 1*
   - Panel 2*
   - Panel 3*
   - SOIF
   - TSG
   - Security
   - Naming & Registration
   - NWI Template

   *Chairperson reports should include (1) resource and schedule status, (2) panel documents requiring MC approval, and (3) an identification of which of that panel's products should be considered for submission as future ISO standards.

10. Report from Liaisons & Review of Liaison Relationships

11. Special Topics:
    - Approval of CSP / COP
    - Interplanetary Internet Status Report
    - Interoperability Plenary Meeting Report

06 Any New Business
Object Management Group's Request for Information

13. Planning for next TSG / MC meetings

14. Approval of Resolutions / Action Items

15. Adjourn (12:00 Noon, 14 December, 1999)

Fall Management Council Meeting
Summary of Comments
on Action Items

OPEN ACTIONS

98-6. The TSG shall develop a template for the panel reports to the MC that differentiates between active and inactive items in the work program, shows changes since the last report, panel document status, the schedule for the work, and any issues impacting panel production.

Assignee: TSG Chair
Due Date: Next MC Meeting
STATUS: OPEN

99-1. Provide comments to Secretariat and Panel Chairmen on the P2 procedures with regard to processing non-CCSDS / external standards (included below).

"CCSDS endorses procedures developed by P2 to allow outside agencies to act as a maintenance agency for Mode 2 and Mode 3 documents. This may involve that agency's posting updates between official new versions of the document. Official releases of such documents, however, would require CCSDS approval."

Assignee: MC Members
Due Date: July 15
STATUS: OVERDUE - The CEOS project had requested an answer within two months of the Spring CCSDS meeting.

99-18. Provide recommendations and supporting information about new activities to be included in the CCSDS site under "It's Hot."

Assigned to: Panel Chairmen
Due Date: Continuing action
STATUS: OPEN – No inputs have been submitted to date.

99-25. Document editors and the respective panel chairmen shall determine when a Green Book can provide useful information and is, therefore, ready for release.

Assignee: Appropriate Document Editor and Panel Chairman
Due Date: As appropriate
STATUS: OPEN

ACTIONS RECOMMENDED FOR WITHDRAWAL

98-13. The TSG shall review the list of liaisons and determine the appropriate organizations and the appropriate persons to act as liaisons.

Assignee: TSG Chair
Due Date: Next TSG Meeting
STATUS: OPEN

98-16. The Agencies shall respond to the Agency CCSDS Utilization Questionnaire, which was provided as part of the Secretariat Mail-out Package for the Spring '98 meeting, letter dated 8 May '98.

Assignee: All Agencies
Due Date: Next TSG Meeting
STATUS: OPEN

98-19. The Agencies shall collect information on products developed within their respective countries and provide it to the Secretariat for inclusion in the CCSDS-Compatible Products database.

Assignee: All Agencies
Due Date: Next MC Meeting
STATUS: OPEN - To date, responses has been received from ESA, NASDA, NASA and BNSC.

98-23. Review existing materials promoting CCSDS and develop recommendations for coordinating these elements into a cohesive marketing strategy.

Assignee: Mr. D. Townley, Dr. D. Giarerra, and Dr. E. Bergamini
Due Date: Next MC Meeting
STATUS: OPEN

99-2. Provide membership lists on line including links to members and associates web sites.

Assignee: Secretariat
Due Date: Best Efforts
STATUS: No Activity; this is considered to be a low-priority effort.

99-3. Place all Red Books on the CCSDS web site and on CCSDS CD-ROMs. Each document shall contain in its FOREWORD appropriate text as to the stability of its technical content.

Assignee: Secretariat
Due Date: July 15
STATUS: OPEN - In Progress; new CD-ROM will be distributed when Coding Document has been updated with addition of Turbo Coding.

99-5. In the CCSDS Web Site, include links to CCSDS related news articles

Assignee: Secretariat
Due Date: Best efforts
STATUS: OPEN - No Activity, this is considered to be a low-priority effort.

99-6. Each Agency should review the Fleet Chart and validate their respective mission(s) as being CCSDS-compatible. Provide information on missions that are CCSDS-compatible but not shown.

Assignee: All MC Members / Observers as appropriate
Due Date: July 15
STATUS: OPEN - This is an on-going activity for agencies as new missions are approved.

99-13. Provide to the Secretariat a proposed letter to the IAA, re: Action item 98-27, expressing concern about the proposed change in the name of one of their committees to Operations, Standards, Quality and Safety. This letter is to highlight the difference in the role of standards compared to quality and safety.

Assignee: CSA / Mr. A. Bastikar
Due Date: July 15
STATUS: OPEN

99-14. Put Art Work for the NASA booth on the Web for access by the other agencies to facilitate their development of a similar display capability.

Assignee: Mr. M. MacMedan
Due Date: July 15
STATUS: OPEN - None of the agency representatives present at the meeting indicated any intention of creating similar displays at this time.

99-21. Propose ways to improve MC operations by way of reducing Agency travel budgets, reducing face-to-face meetings and increasing productivity with regard to the ESA proposed change in Methodology of CCSDS Operations.

Assignee: Members and Observers
Due Date; Next Meeting
STATUS: OPEN

CLOSED ACTIONS

98-32. Secretariat to draft statement explaining final draft status that would be included in stable red books.

Assignee: Secretariat
Due Date: Next MC Meeting
STATUS: CLOSED - Draft text will be provided during this next meeting.

99-4. Remove references to Panel 4 from organization structure in CCSDS documentation and presentations.

Assignee: Secretariat
Due Date: July 15
STATUS: CLOSED

99-7. Furnish a picture of Mars Express to Mr. T. Gannett for inclusion in the Fleet Chart.

Assignee: ESA
Due Date: July 15
STATUS: CLOSED

99-8. Confirm that the AR list on the Web is complete.

Assignee: Secretariat
Due Date: July 15
STATUS: CLOSED

99-9. Resend the CCSDS Utilization Questionnaire to CNES.

Assignee: Secretariat
Due Date: July 15
STATUS: CLOSED

99-10. Process the CCSDS Strategic Plan as follows:
-Comment on version 3.1 June 07
-Revise and distribute version 4 - June 21
-Comment of version 4 - July 5
-Revise and distribute version 5 - July 19
-Indicate Approval of version 5 - July 20
(Approval is to be by e-mail or electronic signature)

Assignee: Members / Observers / Working Group respectively
Due Date: As shown
STATUS: CLOSED - Inputs have been provided and Plan will be presented at the Fall 99 meeting.

99-11. Process the CCSDS Operating Plan as follows;
-Distribute Operating Plan, Version 2.1 - June 21
(Include matrix of tasks and priorities of interest)
-Return comments re Version 3 - July 19
-Distribute Operating Plan, Version 4 - August 21
-Return comments re Version 4 - September 20

Assignee: Members / Observers / Working Group respectively
Due Date: As shown
STATUS: CLOSED - Inputs have been provided by Panel Chairmen and the plan will be presented at the Fall 99 meeting

99-12. Panel Chairmen to review the CCSDS Operating Plan to assure that the panel Programs of Work in the Plan are complete. Provide information to the document editor on any work items (anticipated or existing) not currently reflected in the plan for inclusion in the document.

Assignee: Panel Chairmen
Due Date: July 19
STATUS: CLOSED - Inputs have been provided by Panel Chairmen and the plan will be presented at the Fall 99 meeting.

99-15. Assign suitable experts to the Spacecraft On-Board Interfaces (SOIF) WG.

Assignee: Member and Observer Delegates
Due Date: July 15.
STATUS: CLOSED - members have been appointed and the first SOIF presentation will be made at the Fall 99 meeting.

99-16. Re the IAF meeting in Brazil, determine the due date for papers and seek to establish a place on the agenda for CCSDS presentations on mission interoperability.

Assignee: Dr. E. Bergamini
Due Date: July 15
STATUS: CLOSED - At least two papers have been submitted for consideration by the Selection Board. Consideration is being given to establishing a separate session on standards.

99-17. Solicit papers for SpaceOps 2000 from your specific agency and coordinate the selection of those papers to be presented at the conference.

Assigned to: Member and Observer Delegates
Due Date: July 15 (Abstracts are due by Sept 30, 1999.
STATUS: CLOSED - A number of papers have been submitted for consideration by the selection board.

99-19. Resend to Members, the URL for the CCSDS-Compatible Products database.

Assignee: Secretariat
Due Date: July 15
STATUS: CLOSED

99-20. Determine the outcome of the IAF planning session for the Amsterdam meeting with regard to “Standards”.

Assignee: Secretariat
Due Date: July 15
STATUS: CLOSED

ATTACHMENT B

DOCUMENT STATUS

as of 12/13/99

CCSDS DOCUMENTS - SUBMISSION TO ISO (Page 1 of 5)

DOCUMENT	CCSDS DATE	CCSDS NUMBER	ISO Number	ISO DATE
Telemetry Channel Coding	**92-05**	**101.0-B-3**	**ISO 11754**	**1994**
(Document being modified to include Turbo Coding (9/99)			**Resubmitted for DIS Review of Turbo Codes**	**Now out for 5-year ISO review**
Packet Telemetry	**95-11**	**102.0-B-4**	**ISO 13419**	**97-12**
Packet Telemetry Services	**96-05**	**103.0-B-1**	**DIS 17433**	**FDID Progression Requested 99-01**
Lossless Data Compression	**97-05**	**121.0-B-1**	**FDIS 15887**	**FDIS Progressed to Formal Voting 99-11**
Telecommand Part 1 — Channel Service	**95-11**	**201.0-B-2**	**ISO 12171**	**98--07**
Telecommand Part 2 — Data Routing Service	**91-11 Reconfirm 96-06**	**202.0-B-2**	**ISO 12172**	**98-09**
Telecommand Part 2.1 — Command Operation Procedures	**91-10 Reconfirm 98-06**	**202.1-B-1**	**ISO 12173**	**98-08**
Telecommand Part 3 — Data Management Service	**87-01**	**203.0-B-1**	**ISO 12174**	**98-07**
Time Code Formats	**90-04**	**301.0-B-2**	**ISO 11104**	**1991 (Reconfirmed 1996)**
CCSDS GSCID Field Code Assignment Control Procedures	**99-05**	**320.0-B-2**	**Not applicable**	**Decision made not to progress document**
Radio Frequency and Modulation Systems—Part 1: Earth Stations and Spacecraft	**97-05**	**401.0-B**	**Not applicable**	**Decision made not to progress document**

CCSDS DOCUMENTS - SUBMISSION TO ISO (Page 2 of 5)

DOCUMENT	CCSDS DATE	CCSDS NUMBER	ISO Number	ISO DATE
Radio Metric and Orbit Data	**87-01**	**501 0-B-1**	**ISO 11103**	**1991**
(Document being updated within CCSDS)				**(Reconfirmed 1996)**
Standard Formatted Data Units—Structure and Construction Rules	**92-05**	**620.0-B-2**	**ISO 12175**	**1994**
Standard Formatted Data Units—Structure and Construction Rules	**Reconfirm 99-05 for 5 years**		**(Corrigendum 1)**	**Reconfirm for 5 years (99-11)**
Standard Formatted Data Units ---Structure and Construction Rules (Corrigendum to document)	**96-11**	**620.0-B-2/ Cor 1**		
Standard Formatted Data Units — Referencing environment	**97-05**	**622.0-B-1**	**FDIS 15888**	**FDIS Progressed to Formal Voting 99-11**
Standard Formatted Data Units — Control Authority Procedures	**93-06 Reconfirm 99-05 for 5 years**	**630.0-B-1**	**ISO 13764**	**96-12**
Standard Formatted Data Units — Control Authority Data Structures	**94-11**	**632.0-B-1**	**ISO 15395**	**98-03**
Parameter Value Language Specification (CCSD0006)	**92-05 Reconfirm**	**641.0-B-1**	**ISO 14961**	**97-12**
(Being Updated within P2)	**98-06 for 1 year**			
ASCII Encoded English (CCSD0002)	**92-11 Reconfirm 99-05 for 5 years**	**643.0-B-1**	**ISO 14962**	**97-12 Reconfirmed for 5 years (99-08)**

CCSDS DOCUMENTS - SUBMISSION TO ISO (Page 3 of 5)

DOCUMENT	CCSDS DATE	CCSDS NUMBER	ISO Number	ISO DATE
Data Description Language EAST Specification	**95-11**	**644.0-B-1**	**FDIS 15889**	**FDIS to Formal Voting 99-11**
Data Description Language EAST – A Tutorial	**97-05**	**645.0-G-1**	**---**	**---**
Data Description Language EAST – List of Conventions	**97-05**	**646.0-G-1**	**---**	**---**
Data Entity Dictionary Specification Language (DEDSL) (Abstract Syntax[CCSD0011])	**99-12**	**647.0-R-3**	**---**	**---**
Data Entity Dictionary Specification – A Tutorial	**Planned**	**647.0-G-1**	**---**	**---**
DEDSL PVL Concrete Syntax	**Planned**	**647.2-W-1**	**---**	**---**
DEDSL XML Concrete Syntax	**Planned**	**647.3-W-1**	**---**	**---**
Space Systems - Archiving Space Data	**99-05**	**650.0-R-1**	**CD 14721**	**DIS Progression Requested 99-08**
Advanced Orbiting Systems, Networks and Data Links: Architectural Specification	**92-11**	**701.0-B-2**	**ISO 13420**	**97-12**
Advanced Orbiting Systems, Networks and Data Links: Audio, Video and Still-Image Communications Services	**94-05**	**704.0-B-1**	**DIS 15890**	**Held as DIS – 99-01**
Space Communications Protocol Spec (SCPS)—Network Protocol (SCPS-NP)	**99-09**	**713.0-B-1**	**DIS 15891**	**FDIS Progression Requested 99-08**
Space Communications Protocol Spec (SCPS)—Security Protocol (SCPS-SP)	**99-05**	**713.5-B-1**	**DIS 15892**	**FDIS Progression Requested 99-08**
Space Communications Protocol Spec (SCPS)—Transport Protocol (SCPS-TP)	**99-05**	**714.0-B-1**	**DIS 15893**	**FDIS Progression Requested 99-08**
Space Communications Protocol Spec (SCPS)—File Protocol (SCPS-FP)	**99-05**	**717.0-B-1**	**DIS 15894**	**FDIS Progression Requested 99-08**
CCSDS File Delivery Protocol	**99-06**	**727.0-R-2**	**AWI 17355**	**99-05**
Standard Terminology, Conventions and Methodology (TCM) for Defining Data Services	**94-11**	**910.2-G-1**	**---**	**---**

as of 12/13/99

CCSDS DOCUMENTS - SUBMISSION TO ISO (Page 4 of 5)

DOCUMENT	CCSDS DATE	CCSDS NUMBER	ISO Number	ISO DATE
Cross Support Concept – Part 1: Space Link Extension Services	**95-05**	**910.3-G-1**	**---**	**---**
Cross Support Reference Model Part 1: Space Link Extension Services	**96-05**	**910.4-B-1**	**ISO 15396**	**98-05**
Space Link Extension – Service Management Specification	**99-12**	**910.5-R-1**		
Space Link Extension – Return All Frames Service Specification	**00-01**	**911.1-R-2**		
Space Link Extension – Return Virtual Channel Frames Service Specification	**00-01**	**911.2-R-2**		
Space Link Extension – Forward CLTU Service	**00-01**	**912.1-R-2**		
Space Link Extension – Forward Space Packet Service Specification	**00-01**	**912.3-R-2**		

as of 12/13/99

CCSDS DOCUMENTS - SUBMISSION TO ISO (Page 5 of 5)

OBSOLETED DOCUMENTS	CCSDS Date	CCSDS Number	ISO Number	ISO Date
Advanced Orbiting Systems, Networks and Data Links: Abstract Data Type Library—Addendum to CCSDS 701.0-B-2	**94-05**	**705.1-B-1**	**Not Applicable**	**Did not progress to ISO**
Decision made to render document obsolete – 99-05				
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the Path Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**705.2-B-1**	**Not Applicable**	**Did not progress to ISO**
Decision made to render document obsolete – 99-05				
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCLC Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**705.3-B-1**	**Not Applicable**	**Did not progress to ISO**
Decision made to render document obsolete – 99-05				
Advanced Orbiting Systems, Networks and Data Links: Formal Specification of the VCA Service and Protocol—Addendum to CCSDS 701.0-B-2	**94-05**	**705.4-B-1**	**Not applicable**	**Did not progress to ISO**
Decision made to render document obsolete – 99-05				

ATTACHMENT C

TEMPLATE FOR PANEL REPORTS

proposal of typical panel reports contents:

Index

- **Status of activities**
  - **WBS**
  - **Workplan**
  - **Documentation tree/status**
  - **Organisation**

- **Work progress**
  - **Actual production of recommendations (compared to forecast)**
  - **Accomplishments**
  - **Meetings held/planned**

- **Resolutions to MC**

- **Conclusions/Issues**

ATTACHMENT D

BNSC REPORT

BNSC Report to the CCSDS Management Council 13-14 December 99

CCSDS recommendations and their associated ISO and BSi standards continue to grow in importance within the BNSC programmes and we maintain our support to the CCSDS Panels, the TSG and the MC. Overall BNSC staff levels for this work are around 2 staff years per year (including industrial support) but now with additional resources via a contract with Vega to prototype SLE services within the UK STRV programme.
BNSC has taken particular interest in Security, the SLE services, Archiving standards, Data Interchange software, Turbo Codes and Interoperability.

We have supported the ongoing review of the CCSDS Strategic Plan and Operating Plan including the further canvassing of views from the UK community. These plans are considered to be a good and supportable by BNSC in its areas of interest. We have indicated these areas where our priorities lie i.e. the work of Panel 2 (including archiving), turbo codes, security, SLEs and the work of the new panel on payload interfaces.

Panel 1

The BNSC work here has been particularly in the areas of the new file delivery protocol (CFDP), security, turbo codes and data compression.
The BNSC work on the CFDP has progressed to the testing and evaluation phase in collaboration with others e.g. GSFC. On security our work has continued with the extension of the Security Green Book to P2 and P3 and participation in "threat" analyses. Interest in Turbo Codes continues with a considerable contribution from UK industry who organised a Turbo Codes for Digital Broadcasting at the IEE London on 22.11.99.
BNSC also supported the December 99 meeting of the SOIF. In addition we are investigating the funding of work on the Interplanetary Internet.

Panel 2

BNSC continues to provide the Panel 2 chairman plus one other active member of this panel. Thus we have contributed to the Red Books for the Archive Reference Model and the DEDSL together with work towards new standards flowing from the archive reference model such as Data Ingestion. Also, the review of the Catalogue Interoperability Protocol (CIP) produced by CEOS. However, CEOS have now decided to progress the CIP to an ISO standard via TC211, rather than SC13, as they are content with the higher level standard compatible with the TC211 standards.
In addition we have developed more software routines to facilitate the implementation of the CCSDS Panel 2 recommendations. This has included the production of Java routines to interface between data objects and coordinating similar work from the other panel members. The Solar Terrestrial Physics Data Facility at RAL has been used as a test bed for these routines and to facilitate demonstration of a system using Java beans to access data descriptions from the Control Authority and process data objects.

D Giaretta attended the Unispace meeting in July 99 to present, in collaboration with K Lenhart, the work of CCSDS. Also, he supported a CEOS meeting October 99 (Nairobi) to explain the work of the CCSDS and discuss the value of standards in the work of CEOS.

Panel 3

BNSC supports the work of the panel and UK industry has been employed to assist with the specification writing for the SLE Services. In addition DERA has placed a contract with Vega to prototype the SLE services for Return All Frames and Forward CLTU within the UK STRV programme. The architectural design is now complete and implementation has started. This will include generation of the Guidelines for Definition of Managed Objects (GDMO) which can then be provided for use within Panel 3.

Other Meetings and Conferences

Papers were presented by RAL and DERA at the IAF Congress in Amsterdam, October 99, describing autonomy and interoperability techniques developed for the S Band stations at RAL and West Freugh. The papers emphasized the value of the practical implementation of the CCSDS recommendations for encoding, decoding and SLE services in achieving the desired goals.

ACE and STRV

The RAL S Band ground station has now provided telemetry capture support to the Advanced Composition Explorer (ACE) mission for nearly 2 years. This has shown the reliability and good performance achievable with the CCSDS compatible AVTEC decoder system which provides bit synchronisation, Viterbi decoding, frame synchronisation and Reed Solomon error correction before automatically sending the telemetry frames to the Space Environment Center at Boulder.

P. Vaughan 2.12.99

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ATTACHMENT E

CNES REPORT

6 December 1999

CNES REPORT

CCSDS MANAGEMENT COUNCIL
ESRIN (FRASCATI) December 1999

INTRODUCTION

-CNES maintains its interest for CCSDS activities.
-CNES has participated in CCSDS panel meetings before fall 1999 Management Council and in ISO archiving workshop.
-CNES continues to provide the chairmanship of panel 3 and the chairmanship of ISO/TC/20/SC/13. CNES proposes that Mr Roland Ivarnez completes the term of Mr Jean Latour as chairman of ISO/ SC/13 after Mr Jean Latour retirement,at the end of this Year .This point will be addressed for agreement at the SC/13 meeting.
-The CNES manpower involved in CCSDS activities was maintains at a constant level:

4 man years

NEW IMPLEMENTATION OF CCSDS RECOMMENDATIONS

-For the new mini-satellite family CNES developed a multimission platform. This platform is compatible with telemetry and telecommand CCSDS recommendations and is used for following scientific projects :

Jason (in cooperation with J P L)
Corot
Picasso Sena (in cooperation with J P L)

- For the both micro-satellite "Demeter and Picard " CNES reuses the ground/space interface compatible with CCSDS developed for mini-satellite family .
- THE CCSDS recommendation dedicated to EAST language is used by following projects:

Jason
Phobos
Arcad3
Ether
Eiscat
Doris on Envisat

CNES SUPPORT TO CCSDS ACTIVITIES

- CNES managed the review of the Data Entity dictionary Specification Language 647.0-R-2.7 .This red book is ready for blue book review.
- CNES has supported the review of CCSDS File Delivery Protocol (CFDP) 727.0-R-2
- CNES approve the strategic plan draft 5.

- CNES activities into Panels are following:

Panel 1 A

- CNES continues to support panel 1A by participation into working meetings
-CNES has actively supported the sub panel "Lossy Image Compression " and has proposed an algorithm for compression "Digital Wavelet Transform " DWT .CNES is also working in the standardisation committee ISO-JPEG 2000. This group is data compression oriented and CNES propose that this committee take into account space application in liaison with CCSDS .
-CNES has proposed a new standardisation based on Channel Codes with limited overhead.
–CNES has actively supported the COP 1 working group.
–CNES is working for the French translation of DIS 11754 (CCSDS 101.0-B-4) .

PANEL 1 E

-CNES has actively supported activities of panel 1 E
-CNES is preparing a proposal for new bandwidth efficient code, CNES proposes two solutions, modulation 8-PSK with trellis coded modulation and modulation QPSK with turbo codes high rate .
–CNES is working in the new working group 1 E/1 A for evaluation of 8PSK TCM modulation.

PANEL 1F

- CNES continues to support panel 1F meetings with manpower difficulties .
-CNES has reviewed the red Book 727.0-R-2 File Transfer Protocol (CFDP) and is supporting the evolution of this red book after implementations for test .
-CNES does not have the availability of expert to perform and review the French Translation for SCPS red books and CNES is waiting proposal from ESA or CSA.(action 99-3 of the last SC/13 meeting)

PANEL 1 J

- CNES continues to support panel 1 J.
-CNES has prepared a draft of new recommendation in order to define the contains of orbit data package used for ground station designation .

- CNES has analysed existing normalisation in the domain of “reference frame “.

Page 2

PANEL P1 SOIF

-CNES continues to support the new panel SOIF and will actively participate to the first CCSDS P1 SOIF meeting 9-10 December .

PANEL 2

-CNES has actively supported all activities of panel 2 .
- CNES has worked mainly as editor of the DEDSL (Data Entity Dictionary Specification language) 647.0-R-2.7 .After two days of review , the panel 2 approved the final version .
- CNES has also reviewed the DEDSL PVL Syntax CNES is the editor of this document not yet finalised .A tutorial Green book, companion of the DEDSL PVL Syntax ,is under preparation by CNES.
-CNES is working for the French translation of CCSDS 650.0-R-1 (CD 14721) OAIS

PANEL 3

- CNES continues to support Panel 3 with some difficulties for maintaining the manpower
–CNES continues to actively participate to the WG 1 working group (SLE services management recommendation production)
- CNES reviewed the Transfer Services Recommendation in the aim of the elaboration of the combined Return Services Recommendation production.
– CNES actively participate to the technical discussions leading to given up the limited versions
of CLTU and RAF services .

QUESTIONNAIRE

- Via BNAE, CNES has provided French space industry with a copy of the questionnaire requesting input for the CCSDS implementation green book .To day one company “ELFES ELECTRONIQUE “ has addressed ,to the secretariat, a documentation related to following ground facilities:

Stand alone PC Telecommand encoder
and Stand alone PC Telemetry decoder

OTHER SPACE STANDARDISATION ACTIVITIES

- CNES is working for ECSS (European Cooperation for Space Standardisation),notably in drafting group E 70 Space engineering Ground Systems and Operation.
The document E70 draft 13(June 99)is approved by ECSS Steering Board .
-In ISO/TC/20/SC14/WG 3 CNES is involved in following drafting group:
WD 14620 Launch Operations (in DIS)

WD 14950 Satellite Operability (in review by SC /14 before moving to ISO/DIS
-CNES has actively participated to the Interoperability Plenary Meeting in Paris .
page 3

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ATTACHMENT F

DLR REPORT

MCREP1299

DLR- GSOC
Status Report to the CCSDS Management Council
ESRIN / Frascati
December 1999

DLR-GSOC continued its work within the reporting period with emphasis on the work of panel 3 but also active work in P1E and P1J was done.
Although the GSOC organisation was restructured in 1999, the GSOC manpower support to CCSDS will stay the same. With this present understanding of the work and the experience in the past, the present version of the strategic plan has to be carefully taken: in the definitions of the elements and the durations of timeframes some elements have little relationship to actual real tasks of interest for the agencies and the definitions of the durations of the short, medium and long terms are too small. Therefore, when developing the panel work plans on the basis of this plan, care shall be taken by the agencies to precisely identify their interest in which element and timeframes there are interested and what manpower they commit to allocate.

1 PANEL RELATED REPORT

1.1 PANEL 1

- Panel 1E: RF/Mod:

DLR continued to stay in an active role for Panel 1E. Within the reporting period, support was given in the analysis of the position papers for the bandwith saving modulations method. An analysis on the method of synchronisation for turbo codes, used at very low SNR, was supported. A comparison of several studies in the area of modulation methods for high data rates was supported.

- Panel 1J, Navigation:

DLR-GSOC in its role of being a central node in Europe and relying on other agencies functionalities, has a big interest in the work of the navigation data panel P1J. GSOC therefore is participating in the P1J work actively and is participating in the ESOC meeting in December. The draft green book for navigation data is in a very preliminary state. The presently used formats by the major agencies are not addressed adequately. GSOC has concerns in using SPK files as an international standard, since the JPL SPICE system is an inadequate interface for the exchange of operational navigation data between the agencies. This discussion is also true for the RINEX format.

- All other Panel 1 Sub-Panels:

DLR stayed in a monitoring role.

1.2 PANEL 2

DLR stayed in a monitoring role.

1.3 PANEL 3

The SLE-service red books to RAF, CLTU, FSP and RCF evolved slowly in the last ½ year, but nevertheless good progress was made until the end of the Darmstadt meeting in October to enable the agency review. The decision to concentrate all remaining service definitions in combined separate Forward- and Return-books is highly appreciated by GSOC. The Management Book should be progressed quickly in order to allow a review also in relationship to the service definitions red books.

GSOC appreciates, that the interface definitions, produced in the course of the implementation of SLE for the INTEGRAL mission will become blue books, in order to enhance the oversight and increase the acceptance of the SLE services by the users.

Similar to NASA (SLE services will be implemented for the 26m dishes) and ESA (SLE for INTEGRAL, ROSETTA), GSOC will also do the implementation of SLE services as part of the modernisation plan, with at least the RAF and CLTU service as a first step. Since all hardware necessary for the Uplink- and Downlink-Chains are already ordered for Weilheim, the new station systems will be in operations towards the end of next year. Since ESOC is developing SLE software as said above, DLR is studying the possibilities to use this SW package for its Weilheim interface. Due to the planning for this package by ESA (required for INTEGRAL's launch in 2001), the schedule fits into the DLR modernisation schedule for Weilheim.

Implementation of SLE services within the COLUMBUS project, to be operated from GSOC, is also envisaged. Here, due to the nature of the project, different types of interfaces have to be supported.

1.4 TSG

No activity did take place during the reporting period.

2 DLR-GSOC CCSDS Missions

DLR was active in implementations of control centre software for CCSDS missions in the TM/TC area, to support routine operations at GSOC. The following missions will be supported in future with the following CCSDS features:

PROJECT	Launch	Uplink			Downlink		
		Packets	Frame	Code	Packets	Frame	Code
EUTELSAT (5,6)	3,6/00	Y	Y	Y	N	Y	Y**
CHAMP	1/00	Y	Y	Y	Y*	Y	Y**
BIRD	3/01	-	-	-	Y	Y	-
GRACE	1/00	Y	Y	Y	Y*	Y	Y**

* : no segmentation
** : no R-S coding
*** : no 1st header pointer for VC-dump

Software to support these missions exists to a high extent. Some details are mentioned as follows:

Eutelsat W24:

Telemetry: only transfer layer is used.

Telecommand: the full packet standard is used

CHAMP CCS:

Telemetry: fully compliant including the packet layer. Software was developed supporting:

- Transfer Frame Validation (check of counters and check bytes)
- Virtual Channel Demultiplexing
- CLCW Extraction
- Source Packet Extraction

TC System: fully compliant

CHAMP MOS:

1. Telemetry: Transfer and Packet Layer Processing
2. TC: see CHAMP CCS

H. Wanke / M. Drexler
CCSDS
DLR- GSOC

ATTACHMENT G

ESA REPORT

Report of ESA delegation
To the CCSDS Management Council
In Frascati, 13-14 December 1999

General:

The recent set of technical CCSDS Panel meetings took place in Europe in the October to mid December time frame on ESA premises. Therefore, in spite of the still tight travel budget situation, adequate ESA staff could participate in the meetings and could support the considerable technical progress achieved during those working sessions.
The commitment of the staff resources demonstrates the continued interest of ESA to fully support the CCSDS objectives.
In ESA's opinion the Interagency Interoperability Meeting taken place mid year in ESA's headquarter in Paris, was a major milestone in the continued acceptance of CCSDS concepts and products by the Space Agencies participating. The entrusting of the technical leadership to CCSDS for interoperability issues is an important achievement and will make the complete acceptance of CCSDS recommendations worldwide soon a reality. This is also demonstrated by the fact that the International Space Station (ISS) uses many of the CCSDS recommendations (as e.g. defined in the ICD of the ISS to the ESA ground segment).

Promotion:

In this context, it may be interesting to note that ESA has taken some initiative to step up internal promotion of CCSDS products. Presentations were given to ESA programme representatives highlighting CCSDS achievements and potential benefits applying the recommendations. These presentations were given within the ESA Engineering Standards Board (ESB), the highest body within ESA coordinating the development of engineering standards. The board concluded also in a recent meeting that basically all the existing CCSDS Space Communications Recommendations should be converted to European Standards within the ECSS standards series.

Support by ESA to CCSDS panel work:

ESA continues to support actively all panels and subpanels of CCSDS and is directly involved in the production of all major books. Obviously, due to limitation of resources, priorities have to be set and subjects of higher interest to ESA's work programme are more actively supported than others. Within the infrastructure directorate more than 15 individuals work directly on preparation or implementation of CCSDS recommendations and a total of about 5-6 man-years is spent on CCSDS related standardisation activities by ESA staff, in addition to work by contractor staff. This set of activities is augmented by several CCSDS subject related studies, which will support the technical panel work and may eventually lead to new recommendations.

The recent set of technical panel meetings included the following sessions, supported and hosted by ESA:

- in October 1999 Panel 1 and Panel 3 meetings in Noordwijk and in Darmstadt,
- in November 1999 Panel 2 meetings in Villafranca
- in December 1999 the rest of the Panel 1 meetings in Noordwijk
-

Implementations of CCSDS recommendations:

ESA is actively continuing its policy to implement CCSDS recommendations. Presently the largest activity concerns the implementation of SLE recommendations for ESA's infrastructure. The first projects benefiting will be Integral, Rosetta and Mars Express. In addition the COF/ATV (ESA elements for the ISS) control centre is required to support SLE services as well.

ESA supports also the prototyping of the CCSDS File Delivery Protocol (CFDP), which will be used to handle file transfers for future missions.

Observations to work of technical panels:

Within the RF&Modulation area, special emphasis has been taken to tackle the ever increasing problem of congestion in the frequency band allocated to space, aggravated by the fact that the Mobiles Community keeps enhancing its pressure for the frequency bands used by the space agencies. Therefore work on bandwidth-efficient Modulation schemes and Coding has to be treated with priority, which the subpanels undoubtedly do. But it is important that all agency representatives are aware of the potential threats. In addition, we seem to be facing a similar problem as we had for the Turbocodes situation, namely the issue of licensing, in this case for newer bandwidth-efficient methods, namely GMSK Vs FQPSK modulations. It is important for the agencies to agree on schemes, which are at least for the research environment license free.

As far as the SOIF (Spacecraft on-board interfaces) activity is concerned, ESA is pleased to see such a high worldwide interest in the working group and is quite confident, that the definition of interface standards and reference models will lead to substantial and very visible benefits and savings in particular for the projects and not so much for the infrastructure.

Also of interest to note is the recent enhancement of the ESA Control Authority system. It will permit due to its generalisation a wider use by more panels and projects to get important objects registered.

Finally, ESA considers the work on the two key plans of CCSDS, the Strategic Plan and the Operating Plan, a very important and worthwhile task since it will allow, to focus the attention and the available resources on the high priority tasks and will give considerable visibility to the outside community, which will finally use those services.

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ATTACHMENT H

INPE REPORT

INPE Report
to the
CCSDS Management Council
Frascati, Italy
13-14 December, 1999

The space program of INPE is making progress with its specific projects, depending on the degree of institutional involvement, together with external agencies or other organizations, including industry, at National and International levels. Under this approach, spacecrafts are being developed and/or are or will be launched with direct involvement of NASA, CNES and CAST, besides space industries of their respective countries, to say the least. They are projects ranging from microsatellites to international space station segments or modules. It is not only reaffirmed INPE continuing support to CCSDS but also, that concrete adoption, in a major scale, of CCSDS Recommendations are being expected to derive, to say the least, from the projects which are briefly mentioned in this context.

At the same time, along the current year (1999), the unfolding of the many projects which have international implications, with special emphasis in aspects of ground infrastructure and systems, are claiming for relatively urgent (some, very urgent) solutions which may incorporate (contracts, etc.) from the beginning, of pertinent space standards. By far, this is a particularly true demand in relation to the planned expansion of the Alcantara Space Launch Center, in Sao Luiz, State of Maranhao, where a multinational enterprise is firmly under negotiation for expanding the capabilities of the Center. Under the supervision of the Brazilian Space Agency (AEB), a high level council, involving ministries and industries representatives, was formed during 1999 with the main purpose of coordinating the adoption of adequate standards, among other aspects, in the administrative processes related to the major contracts which are emerging, in the mentioned context. This initiative is particularly important in respect to the upcoming plans for the Alcantara Launch Center and for the International Space Station projects.

Under the initiative of the Space Activity Subcommittee (SC-08:001) of the Brazilian Association of Technical Standards (ABNT), which was created in the mid of 1998, together with its six ISO/SC-13 & 14 related Commissions-of-Studies (CE 08:001.01 to 06) a (still small) set of documents derived from ISO and CCSDS (three documents, related to CE 08:001.06) domains is already being considered for full translation to the Portuguese in 2000, for actual adoption by ABNT as a Brazilian Standard (CCSDS Blue Book) or Report (CCSDS Green Book).

The membership which is being formed with the working group of the CE 8:001.06/ABNT (SC-13 and CCSDS related subject) is effectively permitting the direct involvement of many of the pertinent members with CCSDS work, on behalf INPE. This means that competent and dedicated human resource contribution is effectively being gradually committed by INPE in the many working (sub-) panels of CCSDS.

EDUARDO W. BERGAMINI
INPE Principal Delegate to CCSDS

São José dos Campos, December 1999.

ATTACHMENT I

NASA REPORT

At NASA Headquarters, in the Office of Space Flight (which is the programmatic home of the NASA Standards activity) we have once again had a change in organizational structure. Mr. Joe Rothenberg remains as the AA for Space Flight and Mr. Bill Readdy, who formerly served in the dual role of Director of Operations, and Deputy Associate Administrator for Space Flight, has been selected as the DAA for Space Flight. Mr. Norman B. Starkey will move from being Director of Shuttle Operations under Mr. Readdy to the position of Dir. of Operations, replacing Mr. Readdy. The space communications function will be moved out of the Operations Division and elevated to the Space Communications Division. Mr. Robert Spearing will serve as the Director of Space Communications.

Mr. Spearing led the sizeable NASA delegation to the international 'Interoperability Plenary' session held in Paris on June 21-22, 1999. While the primary focus was on ground stations, the applicability of CCSDS to interoperability was a major consideration at this meeting. Participating agencies include NASA, ESA, ASI, CNES, DLR, NASDA and ISAS. The meeting attendees strongly endorsed the work of the CCSDS and the continuation of CCSDS as the forum for development of technical standards. It was concluded the Inter-Agency Coordination Group, Working Group-4 and the various Inter-Agency Tracking, Communications, and Operations Panels should provide guidance to CCSDS for prioritization of standards development. A multilateral Inter-agency Advisory Group (IAG) should be formed to monitor the guidance process and Mr. Spearing accepted the responsibility for taking the lead in establishing the IAG. Efforts are underway to develop a charter with the intent of scheduling a meeting of the IAG in early February 2000. It is our view the standards program will reap considerable benefit if the agencies follow through with the commitments discussed at the Interoperability Plenary meeting.

The CSOC contract has been in full operation for almost a year now and the contractor is endeavoring to transition from dependence on a NASA operated infrastructure to greater reliance on commercial service providers. In addition, NASA and the contractor are engaged in planning the implementation of a process to make unused network capacity available for sale by CSOC to reimbursable customers. In other words, organizations wanting to use services of the NASA infrastructure would contract with CSOC vice NASA for those services. This process would apply to those organizations seeking services from NASA strictly on a reimbursable basis whether they are government or commercial, foreign or domestic organizations. It would not apply to joint ventures or cooperative programs. The first of such contracts could be in place as early as late spring or summer of CY2000. We will be coordinating with our foreign partners to effect a smooth transition as these plans are solidified.

ATTACHMENT J

NASDA REPORT

STATUS REPORT
CCSDS / MC (Dec.13 -14, 1999 at Frascati Italy)

1. PANEL ACTIVETIES

Panel 1 : Supporting P1 activity
- Proximity 1.0 Space Link Protocol (CCSDS 211.0-R-1) : No comment. Lack of review background data
- Reviewed Radio Frequency and Modulation Systems-Part 1 Earth Stations and Spacecraft (CCSDS 401.0-P-S99)
-Reviwed Efficient Modulation Methods.
There are large network assets using QPSK modulation family worldwide.
Filtered high rate (60Mbps) QPSK modulation adopted by ADEOS-II satellite can meet with the SFCG recomended spectrum mask. It is scheduled to evaluate filtered QPSK at 2000 P1E meeting again. It is considered to be appropriate to release CCSDS 401(3.3.5A)A-1 after next P1E meeting.
- Reviewed CFDP Red-3(CCSDS 727.0-R-3)
- Upgrading CFDP-X S/W(CFDP NASDA version) to CFDP Red-3
- Reviewed Navigation Data Draft White book

Panel 2 : Supporting P2 activity
- Reviewed OAIS Red-1(CCSDS 650.0-R-1) and PVL Pink Book(CCSDS 641.0-P-1.1)

Panel 3 : Supporting P3 activity
- Reviewd SLE Service Management Specification

2. Organization and Manpower

NASDA CCSDS members as follows.
Head Tsukasa Mito
TSG/MC/ISO Hideo Hara supporting Space Data Committee activity in Japan
Panel 1 Toshio Kikuchi (P1A and SOIF)
Kazuo Nakada (P1E)
Yoshitaka Taromaru (former name was Nonaka) (P1F)
Mikio Sawabe (P1J)
Shiro Yamakawa (Optical comm. W.G.)
Panel 2 Yoshio Inoue
Panel 3 Mitsuhiko Fuda
Contract CFDP, RF and Modulation, Secretary : 5 man months

Total manpower has kept approximately 2 persons / year. None is dedicated to CCSDS.
3. Implementation of the Recommendations
1) ONBOAD
-ETS-VII (Rendezvous docking and robotics; Launched in Nov., 1997)
Uplink –Telecommand / Downlink - AOS
We have received AOS telemetry and transmitted telecommand normally.
-ADEOS-II (Earth Observation Satellite; Launch in 2000)
Downlink – AOS
-JEM (Space Station; Launch in 2001)
Uplink – AOS / Downlink – AOS
-HTV (H-2 Transfer vehicle; Launch in 2002)
Uplink – Telecommand / Downlink – AOS

-ETS-VIII (Engineering Test Satellite; Launch in 2002)
Uplink – Telecommand / Downlink – AOS
-ALOS (Land Observation Satellite; Launch in 2003)
Uplink – Telecommand / Downlink – AOS
-SELENE (Selenological & Eng. Explorer; Launch in 2003)
Uplink – Telecommand / Downlink – AOS

2) Ground System
< Space Network >
- AOS TLM and Telecommand operation by Experimental Packet Processor (EPAP) for ETS-VII space link will be ceased by end of 1999.
- CCSDS packet data processing equipment(High rate and Low rate) is now under development. This equipment will be installed in the DRTS (Data Relay Test Satellite) space network BBE located in Tsukuba and Hatoyama.
- Also Low rate CCSDS packet data processing equipment will be installed in the ARTEMIS utilization system BBE located in ESA Redu station.

< Ground Network >
- We have started the design phase of the next generation general purpose ground station that can cope with wide range of CCSDS recommendations.
Up link : Telecommand, Down link : AOS, Range : Tone

CCSDS MC Action Item status

Old A/I number	Description	Status report
MC98-16	Agency CCSDS Utilization Questionnaire	Completed by May 1999
MC98-19	Information on CCSDS compatible products	Completed by May 1999
New A/I number		
MC99-1	Provide comments on the P2 procedures	No comment
MC99-6	CCSDS compatible Fleet Chart	Completed by May 1999. We submitted MTSAT and USERS but are not included yet. Please add the pictures.
MC99-10	CCSDS Strategic Plan	Ready to approve and make signature on Ver.5 CSP
MC99-11	CCSDS Operating Plan	No comment.
MC99-12	Assign expert to spacecraft on-board interface WG	Assigned Mr. Toshio Kikuchi. Completed.
MC99-17	Solicit papers for SpaceOps 2000	No proposal. Completed
MC99-21	Proposal to improve MC operation	Information distribution by Panel chairmen prior to the MC will be helpful to the agency delegates who want to skip the meeting. But the number of participants of the MC and SC13 are limited compare with those of the Panels and Sub-panels.

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ATTACHMENT K

RSA REPORT

Russian Aviation and Space Agency report

The specialists of the rocket and space industry continue to get acquainted with the CCSDS recommendations and standards relating the ISO/TS 20/SC 13 subjects and discuss the draft recommendations (Red Books and Pink Books).

Our specialists have no principal remarks concerning the draft recommendations, but their complete introduction in Russia is retarded by a number of technical reasons.

At the same time the Technical Assignment for space information system equipment is being supplemented with requirements of separate CCSDS Recommendations and ISO/TC 20/SC 13 standards.

Besides that works to introduce the CCSDS Recommendations and ISO/TC 20/SC 13 standards requirements in the national standards, in particular in the standards for Packet Telemetry, Advanced Orbiting Systems, Networks and Date Links: Architectural Specification and others have been commenced.

We hope to take more active part in the CCSDS and ISO/TC 20/SC 13 activity next year.

ATTACHMENT L

CCSDS STRATEGIC PLAN

The approved version of the CCSDS Strategic Plan is on line at the following location:

http://www.ccsds.org/documents/pdf/CCSDS-A01.1-Y-1.pdf

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ATTACHMENT M

CCSDS OPERATING PLAN

The approved version of the CCSDS Operation Plan is on line at the following location:

http://www.ccsds.org/documents/pdf/CCSDS-A01.2-Y-1.pdf

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ATTACHMENT N

INTERPLANETARY INTERNET REPORT

[The Interplanetary Internet Report will be added to these minutes at a later date.]

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ATTACHMENT O

OMG REQUEST FOR INFORMATION

Object Management Group

Framingham Corporate Centre
492 Old Connecticut Path
Framingham, MA 01701-4568

Telephone: +1-508-820 4300
Facsimile: +1-508-820 4303

Transportation Domain Task Force

Request For Information

Space, Satellite, Ground Systems

OMG DTC Document: space/99-11-01

Submissions due: 17th February 2000

1.0 Introduction

This OMG Request For Information (RFI) solicits information from the space industry on which work priorities within the space, satellite, and ground systems area should be agreed and set. The idea with these questions is to identify which among them need to be answered for the industry to effectively move forward. In addition, initial answers to the questions seen as key by the respondents are sought.

This input will be used to create a road map necessary to affect the technical direction of the Space, Satellite, and Ground System (SSGS) Working Group of the Object Management Group as well as other OMG subgroups where appropriate and to guide future Request For Proposal (RFP) documents. The Object Management Group will use this information to begin the technology adoption process for OMG-compliant interfaces for space systems.

The OMG encourages all stakeholders in space and satellite operations business to become involved in this process by responding to this RFI. In particular, we strongly encourage potential users of CORBA-based technologies in satellite operations service platforms to respond to this RFI, indicating the priorities of questions that need to be answered, and where possible providing initial responses to the questions outlined.
The OMG members and non-members may submit responses. Current compliance with the OMG specifications is not a prerequisite for response to this RFI. The RFI response can consist of pre-existing documentation, but should preferably be organised and presented in accordance with this RFI. The OMG will use responses to this RFI to define one or more

RFPs, soliciting OMG Interface Definition Language (IDL) interfaces and corresponding semantic descriptions and sequencing constraints.

This RFI is structured as follows. The scope, objectives and requirements of this RFI are defined in Section 4. Section 5 describes the particular questions that are the subject of the RFI. Sections 2 and 3 provide background information about OMG and RFI/RFP process. Sections 6, and 7 provide information on how to respond to this RFI. The current *Object Management Architecture Guide* (OMAG) is available at http://www.omg.org.

2.0 About The OMG

The Object Management Group (OMG) is the world's largest software consortium with a membership of over 800 vendors, developers, and end users. Established in 1989, its mission is to promote the theory and practice of Object Technology (OT) for the development of distributed computing systems.

A key goal of OMG is to create a standardized object-oriented architectural framework for distributed applications based on specifications that enable and support distributed objects. Objectives include the *reusability*, *portability*, and *interoperability* of object-oriented software components in heterogeneous environments. To this end, the OMG adopts interface and protocol specifications, based on commercially available object technology, that together define an Object Management Architecture (OMA).

3.0 Process

OMG adopts specifications for interfaces and protocols by explicit vote on a technology-by-technology basis. The specifications selected each fill in a portion of the OMA Reference Model. OMG bases its decisions on both business and technical considerations. The OMG Technical Committees (Platform Technology Committee - PTC, Domain Technology Committee - DTC) provides technical guidance to the OMG in making decisions about specifications. The TCs are composed of representatives of all OMG member companies. The TCs are operated by a Vice President of Technology, working full-time for the OMG itself (as opposed to being an employee of a member company).

The TCs operate in a Request for Proposal mode, requesting technology to fill open portions of the Reference Model from international industry. The responses to such a proposal, taken within the specific RFP response period, are evaluated by a Task Force of a TC with the full TC then voting on a recommendation to the Board for approval of a specific addition to the set of OMA specifications. Once a specification is adopted by OMG, it is made available for use by both OMG members and non-members.

There is also an OMG fast track process. This process allows faster adoption of technology in the case where an existing OMG compliant specification exists and there is likely to be no competition. Should the RFI responses indicate that this is the case, use of the fast track process will be considered.

4.0 RFI Scope, Objectives and Requirements

The initial objective of this RFI is to solicit opinions from industry, government, and academic institutions on specific issues that relate to satellite operation architectures and the market that they are intended to support. The responses will be used to formulate a standardization work program. These efforts are intended to result in a set of interrelated OMG standards that together describe a flexible infrastructure that will support the further the development of the Satellite and Ground System Operations. The intent of the RFI is to identify and prioritize the areas which are important to the interface standards.
The Space, Satellite, and Ground Systems Working Group of the OMG has formulated the lists of questions included in this RFI. It is understood that a standards program to cover the scope of this domain would potentially be very large and possibly impact on the work areas of many groups within the OMG. These groups could include other Domain Task Forces and the Task Forces working on the CORBA core architecture and services. The responses to this RFI will be available to all these groups and standardisation initiatives will be co-ordinated between groups seen as appropriate.

4.1 Scope of the RFI

To scope this RFI the rest of this section discusses some key concepts in the Space, Satellite, and Ground System domain.

It is the nature of distributed systems to be large and highly complex. Building a distributed application is very difficult if there are no guidelines to support the whole development process. In practice they could not be built if there were no methods that allowed structuring the overall system into different yet inter-related problem spaces, each being handled separately. Such methods can reduce the complexity of distributed systems by structuring the system into smaller, constituent parts.

The space industry has, in the past, created large programs for the design, integration, test, launch, and operation of satellites and satellite constellations. Although many of these large programs have used distributed computing, there has been little effort in breaking down these larger programs into functionality that can be developed independently. Where this functionality has been broken down there are no standard interfaces to support these functional modules. This RFI is geared toward determining which areas of the space domain can support this breakdown and can support the generation of standard interface definitions. The divisions in this RFI have been determined through the interaction of many of our members as well as talking with other members of the space community.

This RFI has divided the space domain into six areas: functional/operational areas, system-level areas, hardware interfaces area, common services, payload operations, and spacecraft communication protocol. Each of these areas shall focus upon modules (objects/components) that can perform some specialized functionality. Interfaces would be required for both the control as well as data exchange between modules. Note that each of these areas will probably result in a number of RFPs.

The Functional/Operational area focuses upon functional modules that map well into traditional space solutions and are geared towards much of the hardware that is built today. The System-Level area is a breakdown by system design (i.e. electrical power system, thermal system, etc). The hardware interfaces area will capture the interfaces required for "intelligent" hardware – hardware that can expose control interfaces and data requirements when inserted into the system. The common services are services (some that extend/deprecate OMG Common Object Services or that are space domain specific) that are required between objects in the space domain. Payload Operations would contain services to allow some simple processing of the science/payload data and would be expected to be compatible with the clients of that data (i.e. CORBAgis). The spacecraft communication protocol is another area to investigate, where an efficient GIOP may allow on-board hardware to respond to CORBA invocations from other clients (either on board or on the ground). The following six sections will provide some more detail to these definitions.

4.1.1 Functional/Operational Division

There have been many domain analysis projects for satellite control architectures and the ones we are familiar with have broken down the architecture in very similar ways. Currently, a group of companies are coming up with a CORBA-based architecture in which the space domain is broken into multiple subdomains. This group (the Space Object Technology Group (SOTG)) has divided the domain into the following subdomains: Data Acquisition, Automation, Commanding, Logging and Playback, Planning and Scheduling, Remote Processing, Orbit, Attitude, Maneuver, and Vehicle (for more information on these subdomains please consult the sotg web page at http://sotg.gsfc.nasa.gov/SOTG). This is comparable to other domain analyses that have been performed in the past. The SOTG also contains a Common Services area that addresses some of the common functions that need to be performed throughout the subdomains to ensure proper communication between the objects (see the Common Services area).

4.1.2 System-Level Division

As the functional breakdown above was geared towards operating any satellite, launch vehicle or ground asset, the system-level breakdown concentrates more on common subsystems of spacecraft and ground systems. These subsystems are grouped more by spacecraft function, i.e. thermal control system, electrical power system, orbit subsystem, etc. These systems can be further broken down, i.e. the electrical power system would contain a battery pack subsystem(s), relay subsystems, charging subsystems, etc. In order to allow these subsystems to be developed and used, standard interfaces, standard configuration parameters, and standard sub-components must be developed. This is comparable to what the electric power industry has done for their components (XML configuration and a set of IDL methods to extract information from these databases).

4.1.3 Common Services and Mechanisms

There are a number of common services that are necessary to support space operations. These include, but are not limited to Naming, Event, Authorization, Concurrency, Fault Tolerance, Persistence, Messaging, Notification, Time and Time Synchronization, Transform (including Time Transformation, Mathematical and Coordinate Transformation, and

Trending and Statistical Transform), Profile, Stream, and Group Service, and Publish and Subscribe Mechanism, and Fetch Mechanism. Many of these have been addressed by the CORBA industry, however, there are a number of real time issues that also have to be addressed (again some of these have been addressed by the RealTime group at the OMG). The acceptance of these standards will be critical to the ability to truly plug and play space components into an integrated ground and on-board control system. The implementation of these standards for the space industry will eliminate much of the integration (glue-ware) engineering that is presently necessary to allow these components to interact.

4.1.4 Payload Processing

Most spacecraft include a payload whose instruments must be controlled and whose data must be made available to its clients. For many payloads, this data will contain some artifacts of the data collection and downloading mechanisms employed. The data will usually have to undergo some initial processing when received at the ground station (called Level 0 processing). This process can vary from simple decommutation of the telemetry stream through more complex operations (combine sets of decommutated telemetry, stripping off unwanted information) to more sophisticated processing. If standard interfaces are defined for this processing the payload data clients (GIS, telecoms, C4I, scientists) will be able to easily (or automatically) control and receive Level 0 processed data. These interfaces would also be coordinated closely with other groups in the OMG.

4.1.5 Hardware Interfaces

There is a move in the commercial world to create “intelligent” devices, devices that could be plugged into a system, notify the server of who it is and what it can do, and then communicate with other devices on the network. JINI (http://www.sun.com/jini/) is being developed by Sun for the commercial world for this purpose. There are also research areas that are investigating the applicability of this technology to the space domain. These efforts and emerging standards will also be considered by this Working Group.

4.1.6 Satellite Communication Protocol

In order to allow onboard objects that can be communicated with as if they were on the same processor as the client, the on-board processor will require the intelligence to pass invocation requests from one object to another. To perform this efficiently it will be necessary to include standard interfaces as part of the flight processing systems, and also a protocol will need to be established for the uplink and downlink of these invocations for ground systems to communicate efficiently with these onboard objects. There are several groups working on standards (SCP, OMNI, etc) to achieve this type of functionality..

4.2 OMG Standards, RFPs

The OMG currently has a number of accepted standards and standards in process that can be used directly by the Space, Satellite, and Ground System Working Group. There are also a number of Task Forces, Special Interest Groups, and Working Groups that are performing work applicable to the space domain, including Telecommunications, Real Time (with a number of applicable special interest groups), Transportation, C4I, and CORBAgis ,for example.. This RFI is not attempting to cover topics encompassed by these domains (i.e.

Telecommunication Access and Subscription), but the SSGS will coordinate efforts with the other Task Forces and SIGs to ensure compatibility with standards in those other areas.

A list of standards and RFPs that are relevant to this effort and which may require analysis are provided below. These areas should be investigated to see both what work has been done and whether the standards are applicable to the space industry.

All of the ORBOS Standards	- many have direct application ; many might not have the required performance efficiencies
Security SIG's Resource Access Decision Standard	- for simple security implementation
Manufacturing's Data Acquisition RFP	- for possible overlap with space data acquisition requirements
Utilites' Data Access	- investigate to see how other domains are maintaining components configurations
Real Time High Performance's Load Balancing RFP	- for distributing processes
ORBOS Persistent State	- for object persistence
Real Time Fault Tolerance	- for fault tolerant systems
ORBOS Enhanced View of Time Standard (~ Nov99)	- for time synchronization and time maintenance
Telecom's Access and Subscription	- for subscriber information
Dynamic Scheduler	- for both on-board and ground system scheduling
Messaging/Negotiation	- for communications
Notification	- for object notification

As can be seen from this list, there are a number of areas within the OMG to investigate to accept, extend, adapt, or reject some of these standards.

5.0 The Questions

You can help us by indicating on the list below that are the most important questions to be answered in preparation for work in the next 2-3 years.
The questions below are organized into the ten areas:

1) responder information
2) current SSGS breakdown
3-8) sections for each of the six areas mentioned in section 4.1
9) applicable OMG standards
10) other comments.

While completing the question, please remember that the question and answers are for the purpose of developing standard interfaces for the space community. We realize that some of the questions may be obscure to some people. Valid answers for any question below can be "Not Important for standards!" or "Should not be a focus for the next 2 to 3 years", or "I don't know". These answers will help guide the working group towards the more important RFPs.

5.1 Responder Information

1) Are you an end user, integrator, developer, and/or vendor of SSGS products?	Yes / No
2) Who are you developing products/systems for (Government, Commercial, and/or Academia)? If possible, please specify agencies/corporations.	
3) Standards Specifications	
3a) Are the SSGS products you work with developed to any standard specifications?	Yes / No
3b) If yes, what standards are they developed against?	
4) CORBA-based	
4a) Are your SSGS systems currently CORBA based?	Yes / No
4b) Do you plan on having CORBA based products/systems in the future?	Yes / No
5) Would you be interested in developing a standard for SSGS integration?	Yes / No

6) Please provide information on the types of missions your company/products support.

Mission parameter		**Applicable / Not Applicable / Don't Know**
Orbit type	Suborbital	
	Captive earth orbit	
	Interplanetary orbit	
	LaGrange points	
	Type: LEO, MEO, HEO, GEO	
	Other:	
Support Phase	Bench test and integration	
	Factory test and integration	
	Booster integration	
	Launch preparation & propellant loading	
	Boost phase	
	Transfer orbit	
	On orbit	
	End of life	
	Lander operations	

Mission parameter		Applicable / Not Applicable / Don't Know
	Other:	
Range/ Ground support	Dedicated ground support sites & equipment	
	Shared ground support sites & equipment	
	Relay satellite	
	Other:	
S/C formation	Single satellite	
	Homogeneous constellation (please specify size(s))	
	Heterogeneous constellation (please specify size(s))	
	Other:	
Telemetry streams	Single stream /spacecraft	
	Multi streams/spacecraft	
	Other:	
Mission type	Manned mission	
	Unmanned mission	
	Other:	
Operational mode	Manual	
	Interactive	
	Lights out on the ground (automated)	
	Autonomous spacecraft	
	Other:	

5.2 General Breakdown

These questions focus upon the space domain breakdown presented in Section 4.

5.2 General Topics

5.2 General Topics
1) The working group has broken the SSGS domain into the following areas: Functional /Operational Spacecraft Systems Common Architecture Mechanisms and Services Payload Processing Hardware Interfaces Satellite Communication Protocol
1a) Do these areas cover the SSGS domain?
1b) If no, what other topics are of interest?
2) Standards implementation – reference the list from question 1
2a) Is it feasible to try to implement standards in **each** of these areas?
2b) Which area(s) should be focused upon in the short-term?
2c) Which areas have the highest probability of supporting interface standards?
3) Are there any changes occurring technical or otherwise (currently or on the horizon) that will enhance the development of standard interfaces in each of these areas?
4) Are the areas listed in question 1 mutually exclusive (i.e., work in one area does not affect work done in another area)?
4a) Which areas do you feel would need the most coordination with one another?
4b) Would work in one area preclude work in another area?

5.3 Functional/Operation Interfaces Areas

For more information on operational interfaces, please see Section 4.1.1

5.3 Functional/Operational Areas
1) The working group has broken the SSGS operations domain up into the following Functional subdomains: Data Acquisition Commanding Automation – System Health and Reliable Transitioning Logging and Playback Remote Processors Planning and Scheduling Flight Dynamics: Orbit Attitude Maneuver Vehicle – spacecraft specific analytic methods and data
1a) Does this breakout represent the way you look at SSGS systems?
1b) If yes, are there any subdomains missing? Please provide a brief description of any missing subdomains.

5.3 Functional/Operational Areas
1c) If no, please list the subdomains as you view them along with a brief description.
2) Do any reference models/standards exist in these areas?
2a) What are they? Where are these models/standards strengths and weaknesses?
2b) Should these models/standards be extended or enhanced?
3) Standards implementation – reference the list from question 1
3a) Is it feasible to try to implement standards in **each** of these areas?
3b) Which area(s) should be focused upon in the short-term?
3c) Which areas have the highest probability of supporting interface standards?
4) For any areas in question 1 that you feel comfortable with
4a) Do you feel a single RFP would adequately cover the requirements of this area?
4b) Please provide details on the requirements that would need to be addressed for this area.
4c) How dependent would this area be on Common Services in order to interface smoothly with other areas?

5) Please answer the following questions regarding products used in support of each subdomain. If you use a different breakout of the domain or additional subdomains please include them at the end of the table.

Subdomain	Type of products			Product(S) Name	Vendor(s)
	COTS	GOTS	Custom		
A) Data Acquisition					
B) Logging and Playback					
C) Commanding					
D) Remote Processors					
E) Automation					
F) Orbit					
G) Attitude					
H) Maneuver					

Subdomain	Type of products			Product(S) Name	Vendor(s)
I) Vehicle					
J) Planning & Scheduling					
K)					
L)					
M)					
N)					
O)					

5.4 Spacecraft Systems Areas

For more information on spacecraft systems, please see Section 4.1.2

5.4 Spacecraft Systems Areas
1) Is the division of distributed space applications into spacecraft systems (e.g. thermal subsystem, power subsystem, attitude subsystem, payload processor) important?
2) What spacecraft or ground systems are likely to be popular and deployed in this context in the short, medium and/or long term?
3) Which areas are the most critical to be standardized in order to ensure plug-and-play of SSGS systems?
4) Do you feel that the development and implementation of these services could be viable and profitable?
5) Do any standards already exist in these areas?
5a) What are they? Where are these standards strengths and weaknesses?
5b) Should these standards be extended or enhanced?
6) Are there any products currently available or in use?
6a) What are they? Are they COTS, GOTS, or custom implementations? Who are the vendors?
7) Do you feel that the space industry could agree to a standard set of data for particular systems that could be represented and distributed through a standard language (i.e. XML)?
8) For any area that you feel comfortable, please provide detailed requirements.

5.5 Common Services and Mechanism

For more information on specific services, please see Section 4.1.3

5.5 Common Services and Mechanism
1) How important is it to standardize mechanisms and low level services in space systems?

5.5 Common Services and Mechanism
2) What categories of services or specific services are likely to be popular and deployed in this context in the short, medium and/or long term?
3) Do any standards already exist in these areas?
3a) What are they? Where are these standards strengths and weaknesses?
3b) Should these standards be extended or enhanced?
4) Which services are the most critical to be standardized in order to ensure plug-and-play of SSGS systems?
5) Do you feel that the development and implementation of these services could be viable and profitable?
6) Do these low-level services need to be explored before other areas can be pursued?
7) For any service that you feel comfortable, please provide detailed requirements.

5.6 Payload Processing

For more information on payload processing, please see Section 4.1.4

5.6 Payload Processing
1) What reference models/standards exist in this area, where are these models/standards strengths and weaknesses?
1a) In what way should these reference models be extended and enhanced?
1b) What new reference models are required in this area?
2) Who are potential clients for processed payload data?
2a) Please provide details on the processing that would have to be performed for these clients that would need to be performed in the space domain.
2b) What type of controls would the clients require?
3) Identify the primary interfaces that require standardization between the different domains.

5.7 Hardware Interfacing

For more information on hardware interfacing, please see Section 4.1.5

5.7 Hardware Interfacing
1) Could the space operations industry support the use of “intelligent” hardware both for on-board hardware as well as ground-system hardware?
1a) Would intelligent hardware be feasible (i.e. profitable) for manufacturers, integrators, and end-users?
2) Do any standards already exist in these areas?
2a) What are they? Where are these standards strengths and weaknesses?
2b) Should these standards be extended or enhanced?
What type of hardware would be good initial candidates?

5.7 Hardware Interfacing
3) Are there any products currently available or in use?
3a) What are they? Are they COTS, GOTS, or custom implementations? Who is the vendor?
4) Do you have any other comments on hardware interfacing as it relates to the SSGS working group?

5.8 Satellite Communications

For more information on satellite communications protocols, please see Section 4.1.6

5.8 Satellite Communications
1) Is it feasible to implement spacecraft software using object-oriented technologies?
Is it necessary and feasible to implement distributed object technologies on-board a spacecraft?
1a) Are standard spacecraft protocols necessary for intercommunication between software objects on the spacecraft?
1b) Are standard spacecraft protocols necessary for intercommunication between software objects on the spacecraft?
1c) Would current communication protocols perform acceptable for most spacecraft missions?
2) Are standard spacecraft protocols necessary for ground communication with individual objects on the spacecraft?
2a) Would current communication protocols support this?
3) Are there any products that support satellite communication distributed object protocols?
3a) What are they? Are they COTS, GOTS, or custom implementations? Who is the vendor?

5.9 Applicable OMG Standards and RFPs

For more information on applicable OMG standards and current RFPs, please see Section 4.2

5.9 Applicable OMG Standards
1) Are there OMG standards that are applicable to the space industry?
1a) What are some services that should be investigated?
1b) Would these services need to be extended or expanded to suit the needs of the space industry?
2) Are there current RFPs and submissions that should be reviewed to ensure that the space industry needs are met?
2a) What are some of these RFPs and submissions that should be investigated?
2b) Do these RFPs need to be extended or expanded to suit the needs of the space industry?

5.9 Applicable OMG Standards
2c) Do the RFP submissions need to be extended or expanded to suit the needs of the space industry?
3) If you are an implementer of any of these services, how applicable are these implementations to the space industry?

5.10 General Comments

5.8 Other
1) What other issues/questions about the Space, Satellite, Ground System Architecture and Infrastructure need to be addressed?

6.0 Instructions for Responding to this RFI

6.1 General

Companies responding to this RFI shall designate a single contact within that company for receipt of all subsequent information regarding this RFI, and the RFI responses. The name of this contact will be made available to all OMG members.

Responses to this RFI must be received at OMG no later than 5:00 PM EST (21:00 GMT) February 17, 2000.

6.2 Format of RFI Responses

The following outline is offered to assist in the development of your response. You should include:

- A cover letter —the cover letter must include a brief summary of your response and a check-list of items for which you are providing information.
- Your response to any or all of the RFI questions listed in Section 5.
- If necessary, please include a glossary, which maps your terminology to OMG standard terminology. (See the Appendices to the OMA Guide and the CORBA Specification for OMG's standard terminology.)

Although the OMG does not limit the size of responses, you are asked to consider that the OMG will rely upon volunteer resources with limited availability to review these responses. In order to assure that your response receives the attention it deserves, you are asked to consider limiting the size of your response (not counting any supporting documentation) to approximately 25 pages.

If you consider supporting documentation to be necessary, please provide one copy to the Satellite Technology Desk at OMG. Please indicate which portions of this supporting documentation are relevant to this RFI.

NOTE: According to the Policies and Procedures of the OMG Technical Committee, proprietary and confidential material may not be included in any response to the OMG. Responses become public documents of the OMG. If copyrighted, a statement waiving that copyright for use by the OMG is required and a limited waiver of copyright that allows OMG members to make up to at least twenty-five copies for review purposes is required.

6.3 How to Submit

OMG requires that a copy in IBM PC machine readable format (typically ASCII, RTF, MIF, PDF) be sent to the Satellite Technology Desk at OMG. If you are submitting supporting documentation, one copy of the supporting documentation must be sent to the Technology Desk at OMG. Responses to this RFI (and other communication regarding this RFI) should be addressed to:

Satellite Working Group Technology Desk
Object Management Group Inc.
Framingham Corporate Centre
492 Old Connecticut Path
Framingham, MA 01701-4568
USA

Responses to this RFI must be received at OMG no later than 5:00 PM EST DST (21:00 GMT) 17th February, 2000. The outside of packages/envelopes containing submissions or any other communication regarding this RFI should be clearly marked **"SPACE, SATELLITE, GROUND SYSTEM ARCHITECTURE AND INFRASTRUCTURE RFI RESPONSE".**

NOTE: Your organization should be prepared to handle requests for additional copies of your response and should be prepared to handle requests for additional copies of supporting documentation.

6.4 Reimbursements

The OMG will not reimburse submitters for any costs in conjunction with their responses to this RFI.

7.0 Response Review Process and Schedule

As noted in Section 3, responses to this RFI are to be reviewed by the SS&GS WG for the express intent of surveying the industry and providing OMG with technological information and guidance in writing the forthcoming series of RFPs.

7.1 Process

Copies of your response will be delivered to the SS&GS WG membership for review. Based on the responses to the RFI, the SS&GS WG will construct a road map that outlines the timetable that will be used in issuing RFPs for technology. The road map will identify which RFP or RFPs will be issued first, and which (if any) RFPs will be issued in parallel, as well as which OMG Task Force will issue each RFP.

As a forewarning to organizations who intend to respond the forthcoming Space, Satellite, Ground System Technologies RFP(s) when they are issued, please note that responding to an RFP requires:

- A Letter of Intent signed by an officer of your organization signifying your intent to respond to the RFP and a statement of your organization's willingness to comply with the OMG's requirements (e.g., your willingness to license the proposed technology openly).
- The technology submission described in accordance to the RFP. Any technology adopted by the OMG must be commercially available from a Corporate Member. A statement describing how the submission meets this commercial availability requirement is required with the submission.
- Please consult the OMA Guide for a complete description of the OMG's requirements, policies and procedures for technology submissions.

Section 7.3 provides a timetable listing the dates for the issuance and subsequent review of RFI responses.

7.2 Clarification of Responses

To fully comprehend the information contained within a response to this RFI, the SS&GS WG may seek further clarification on that response. This clarification may come in the form of verbal communication over the telephone; written communication; electronic; or a request to make a presentation of the response to the SS&GS WG.

7.3 Schedule

The schedule for responding to this RFI is as follows. Please note that early responses are encouraged.

SS&GS WG recommend issuing the RFI:	November 15th, 1999
DTC recommends issuing the RFI:	November 19th, 1999
RFI issued:	November 19th, 1999
RFI responses due1:	February 17th, 2000

The tentative schedule for the RFI evaluation process is:

RFI presentations:	March 6th, 2000
Road Map for RFPs issued:	June 5th, 2000

7.4 Questions and Further Information

Questions concerning this RFI should be directed to:

SS&GS WG Technology Desk
Object Management Group Inc.
Telephone: +1-508-820 4300
Facsimile: +1-508-820 4303
Internet: request@omg.org/satellite@omg.org

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1 Late responses will be considered until one month prior to the generation of the RFP RoadMap.

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ATTACHMENT P

PANEL 1 REPORT

CCSDS PANEL 1 **Noordwijk, Darmstadt Fall 1999**

P1 CHAIRMAN PROGRESS REPORT

TO THE CCSDS TSG/MC

December 1999 IN FRASCATI

BY

K.G.LENHART (ESA/ESOC)

CONTENTS

I. MEETINGS

II. STATE OF ACTIVITIES

III. RESOLUTIONS

IV. ISSUES FOR TSG/MC

I. MEETINGS

PAST MEETINGS

A whole sequence of Sub-Panel meetings took place in Noordwijk and Damstadt Oct-Dec 99 :

-- P1A, P1A/P1E, P1E, P1F, P1J

- **combined P1A/P1E/**

- **SOIF first meeting**

FUTURE MEETINGS

A Panel 1 plenary meeting will take place in May 2000 in the US

- Next Sub-Panel meetings will take place in May 2000 in the US.

II. STATE OF ACTIVITIES

SUB-PANEL 1A

The Sub-Panel worked on the following subjects:

- **Efficient codes for bandwidth contrained environments**
- **Lossy data compression**
- **Restructuring of Panel 1 books**
- **Proximity Links (Red Book resolution).**

SUB-PANEL 1E

The Sub-Panel worked on the following subjects:

- **Bandwidth-efficient modulation**
- **Improvement of current modulation standards**
- **High rate telecommanding**
- **Turbo Codes**
- **Optical Links**
- **Radio Relay Links.**

SUB-PANELS 1A/1E

The two Sub-Panels worked in a combined meeting at the following subjects:

- **Trellis-Coded Modulation**
- **Turbo Codes**
- **Optical Links**
- **Proximity Links**

SUB-PANEL 1F

The Sub-Panel worked on the following subjects:

- **CFDP**
- **4 SCPS books)**
- **SCPS Green Book**

SUB-PANEL 1J

The Sub-Panel worked on the following subjects:

- **Extensive review of the draft Green Book**
- **Definition on navigation format data**

III. RESOLUTIONS

Related to Sub-Panel 1E

R-E-99-4 P1 resolves to request the MC to approve the release and distribution for agency review:

- Rec. 3.3.5A **MODULATION METHODS AT HIGH SYMBOL RATES TRANSMISSIONS, SPACE RESEARCH, SPACE-TO-EARTH, CATEGORY A**

IV. ISSUES FOR MC

- **Lack of continuity concerning the attendance of experts in Technical Panel meetings**
- **Frequency band congestion requires considerable effort**
- **Need to support IP protocols over space link**
- **P1J progress impacted by current situation (several reasons)**
- **New Working Groups:**
  - **On Panel level: ad hoc WG on onboard interfaces (started work in December 99)**
  - **In Sub-Panel 1E: WG on optical communications.**

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ATTACHMENT Q

SUBPANEL 1E DRAFT MODULATION RECOMMENDATION

CCSDS RECOMMENDATIONS FOR RADIO FREQUENCY AND MODULATION SYSTEMS

Earth Stations and Spacecraft

3.3.5A MODULATION METHODS AT HIGH SYMBOL RATES TRANSMISSIONS, SPACE RESEARCH, SPACE-TO-EARTH, CATEGORY A

The CCSDS,

considering

(a) that efficient use of RF spectrum resources is becoming increasingly important with the increasing congestion of the frequency bands;

(b) that the SFCG has approved a Recommendation[2] which specifies a spectrum mask for emissions with symbol rates below and above 2 Ms/s;

(c) that only filtered suppressed carrier systems can meet the bandwidth efficiency requirements of SFCG spectrum mask Recommendation[1] for symbol rates in excess of 2 Ms/s;

(d) that filtered OQPSK, GMSK[3] and FQPSK-B[4] modulations spectra can meet the SFCG bandwidth requirements for symbol rates in excess of 2 Ms/s with acceptable end-to-end losses;

(e) that generally the filtered OQPSK spectrum is significantly wider than the GMSK and FQPSK-B spectra in a non-linear channel;

(f) that GMSK systems are widely used and present very small performance degradations as compared with ideal unfiltered suppressed carrier systems;

(g) that link performance of FQPSK-B modulation exhibits greater losses than GMSK[2] but may be simpler and less costly to implement than GMSK[2] for some applications;

(e) that FQPSK-B modulation is currently protected by a patent;

recommends

that either GMSK[2] or FQPSK-B[3] (pending the granting of a free license for space research) be used for high data rates transmissions whenever practicable and in any case for rates in excess of 2 Ms/s in communications systems operating at frequencies where the available bandwidth is limited.

---

2 See SFCG Recommendation 17-2R1 or latest version

3 $BT_B = 0.25$, with precoding

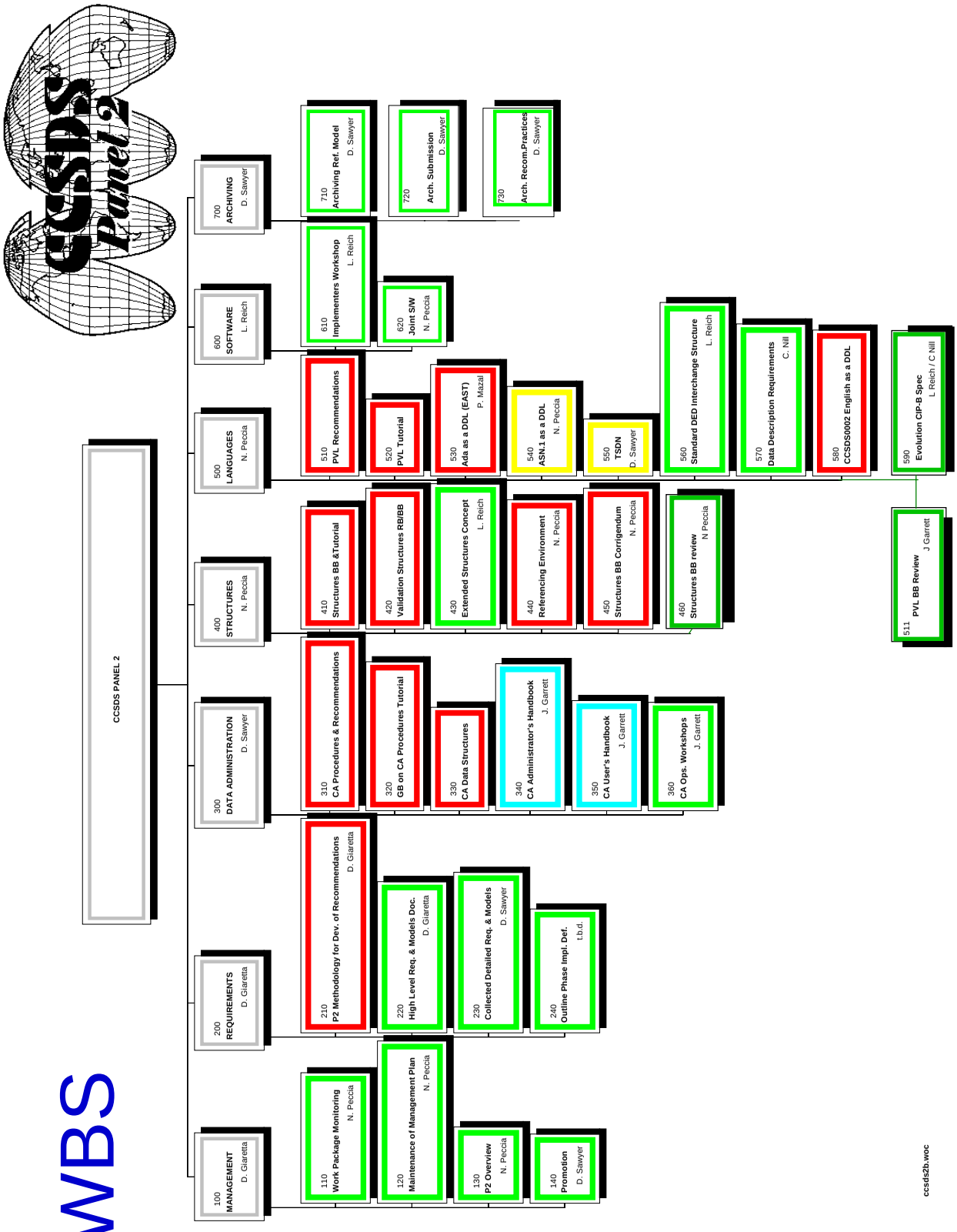
4 US Patent 5491457

ATTACHMENT R

PANEL 2 REPORT

P2 Report to the Management Council

D Giaretta


WBS
CCSDS Panel 2
CCSDS PANEL 2
100 MANAGEMENT D. Giaretta
110 Work Package Monitoring N. Peccia
120 Maintenance of Management Plan N. Peccia
130 P2 Overview N. Peccia
140 Promotion D. Sawyer
200 REQUIREMENTS D. Giaretta
210 P2 Methodology for Dev. of Recommendations D. Giaretta
220 High Level Req. & Models Doc. D. Giaretta
230 Collected Detailed Req. & Models D. Sawyer
240 Outline Phase Impl. Def. t.b.d
300 DATA ADMINISTRATION D. Sawyer
310 CA Procedures & Recommendations
320 GB on CA Procedures Tutorial
330 CA Data Structures
340 CA Administrator's Handbook J. Garrett
350 CA User's Handbook J. Garrett
360 CA Ops. Workshops J. Garrett
400 STRUCTURES N. Peccia
410 Structures BB &Tutorial
420 Validation Structures RB/BB
430 Extended Structures Concept L. Reich
440 Referencing Environment N. Peccia
450 Structures BB Corrigendum N. Peccia
460 Structures BB review N Peccia
500 LANGUAGES N. Peccia
510 PVL Recommendations
520 PVL Tutorial
530 Ada as a DDL (EAST) P. Mazal
540 ASN.1 as a DDL N. Peccia
550 TSDN D. Sawyer
560 Standard DED Interchange Structure L. Reich
570 Data Description Requirements C. Nill
580 CCSDS0002 English as a DDL
590 Evolution CIP-B Spec L. Reich / C Nill
511 PVL BB Review J Garrett
600 SOFTWARE L. Reich
610 Implementers Workshop L. Reich
620 Joint S/W N. Peccia
700 ARCHIVING D. Sawyer
710 Archiving Ref. Model D. Sawyer
720 Arch. Submission D. Sawyer
730 Arch. Recom.Practices D. Sawyer
ccsds2b.woc

Workplan

Research	Development	Deployment
Requirements	**Languages**	**Software**

• XML implementation
  ○ DED
  ○ SFDU
• Java based applications/ classes
• URN-type services from CAA
	• DEDSL
	  ○ XML
	  ○ PVL
	• EAST extension
		• EAST support
		• P2 Promotion
		• Control Authority services
		• CA Agent Services
		• Project usage
		  ○ PAE (ESRIN)
		  ○ Data migration (GSFC)

• Archive services
  ○ Certification
  ○ Ingest
  ○ Identification
	• Archive Reference Model	• OAIS workshops
		Archive (non-space users)

• Internet SFDU's		

Road Map

Data Administration

CA Software | Control Authority Services | Metadata Registry Interoperability

Open Archival Information Systems (OAIS)

Reference Model | Archive Standards | Archive Accreditation Procedures

Data description languages and tools

DDL (EAST) | Data Dictionary Specification | Objects modeling | Interoperable Dictionaries

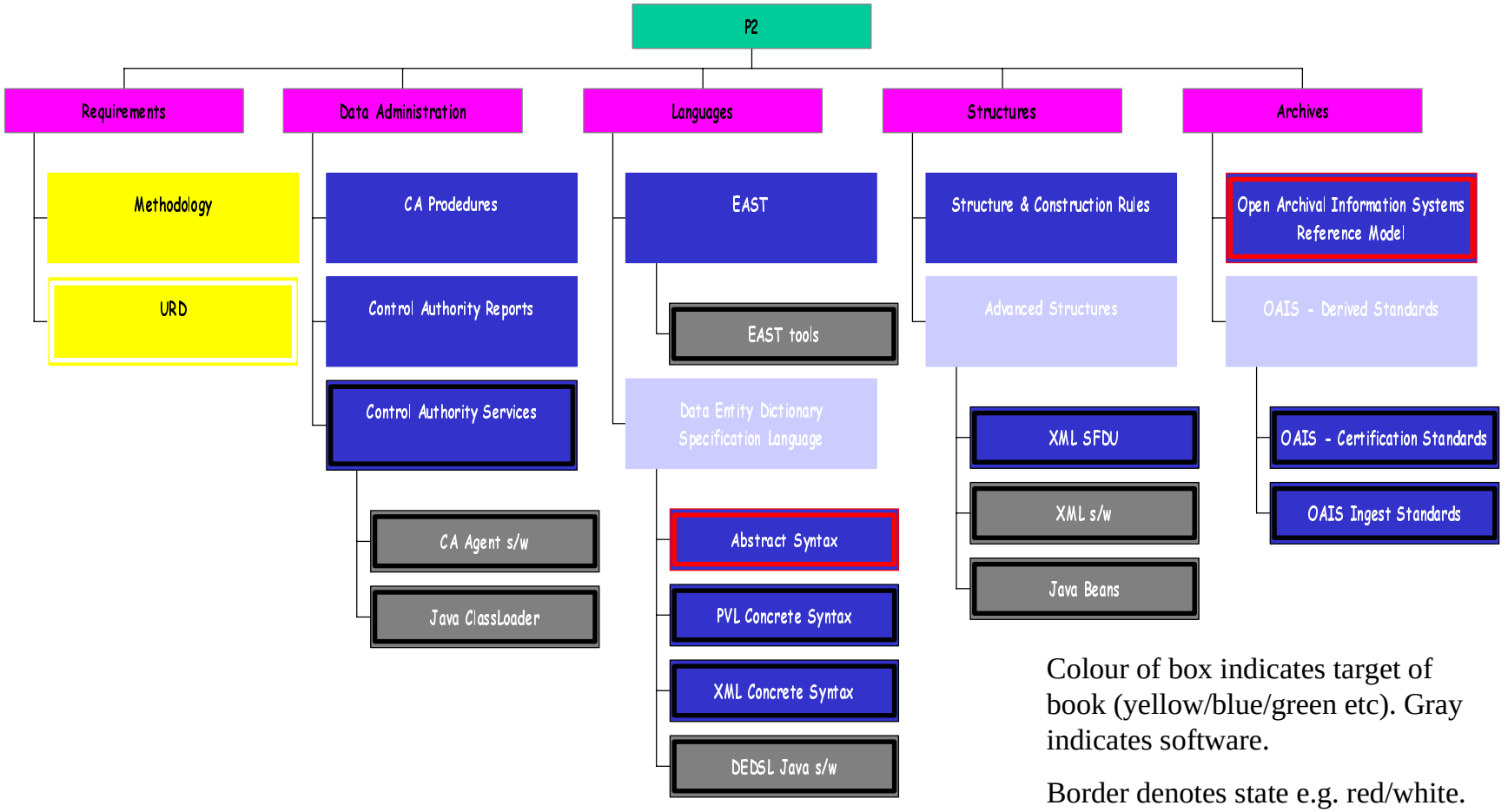
Information Packaging

Referencing Environment | Internet SFDU | Naming Conventions | Object Templates

97 | 98 | 99 | 00 | 01 | 02

Document Tree

Panel 2 Document Tree



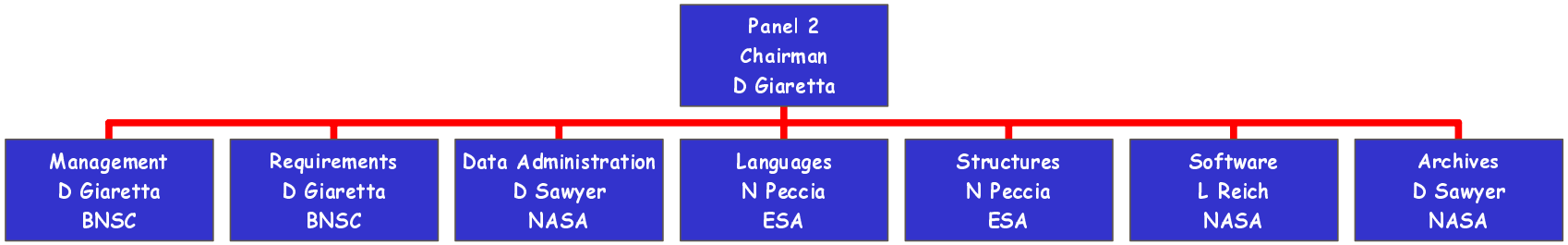
Colour of box indicates target of book (yellow/blue/green etc). Gray indicates software.

Border denotes state e.g. red/white. Black indicates work in progress

Document Status

- OAIS Red Book Agency review RIDS dealt with
  - Request formal extension of Agency review to end at same time as ISO review
- Data Entity Dictionary
  - Abstract Syntax Red Book ready for Agency Review
  - DEDSL PVL Concrete Syntax Red Book should be ready by Jan 2000
  - DEDSL XML Concrete Syntax Red Book should be ready by March 2000
- EAST extension
- PVL extension

Organisation



Work progress

- Actual production of recommendations (compared to forecast)
- Accomplishments
- Meetings held/planned

Actual production of books

- DEDSL Abstract Syntax – RB ready
  - 4 month behind
- DEDSL PVL Syntax – RB planned
  - 6 month behind
- DEDSL XML Syntax
  - on track – similarities to PVL makes this easier than expected
- OAIS Ref. Model
  - on track but ISO DIS 2 months later than hoped??
- Advanced Structures WB
  - New XML work
  - Original work 6 months behind

Accomplishments

- UNISPACE-3 presentation
- CEOS/WGISS-9 presentation
  - WGISS plans still uncertain but stronger liaison certain

Accomplishments (2)

- Books:
  - OAIS RB Agency review complete
  - DEDSL RB ready for publication
- SpaceOps abstracts submitted
- IAF Abstract submitted
- Open MetaData Registries Forum (Jan 2000) – 3 papers submitted
  - Data Dictionaries
  - DEDSL
  - Control Authority Agent

Accomplishments (3)

- Archive work maintaining momentum
  - SpaceOps article
  - Archive Workship on Certification, Ingest, Identification (AWIICS)
  - Coordination of International archive interest
    - National non-space agencies being involved
    - Academic
    - Commercial
- Software prototypes
  - XML being used
    - XML-DEDSL automatic tools
    - SFDU-DTD and JAVA classes prototypes
  - CAA URN services

EAST accomplishments

- CNES
  - SSALTO project
    - JASON (US/French EO Altimeter)
    - DORIS (on ENVISAT)
  - CDPP (Multi-Mission archive and distribution centre)
    - PHOBOS
    - ARCAD-3
    - ETHER
    - EISCAT
  - GERALD extension (used on SPOT 4 & 5)
- ESRIN
  - Archive Management System (AMS), also uses PVL

SFDU Accomplishments

- SFDU usage
  - At GSFC/NSSDC for major migration task
  - SSALTO project at CNES
  - Cluster II (ESA)
  - XMM (ESA)

Meetings held/planned

- Monthly telecons normally held
- Fall 1999 meeting: VILSPA (Spain)
  - 2-12 Nov
- Spring 2000 meeting: proposed as AMES (USA)
  - 4-12 May
- Fall 2000 meeting: RAL (UK)
  - TBD (Nov 4th-)

Proposals for P1J

- Use 8 character ADID in NAV message.
- Describe the NAV messages in EAST e.g. NORAD 2-line elements etc
- Use DEDSL to describe a NAV DED – and perhaps use this within their own document.
  - CNES will look at providing demo of tools describing the formats – CNES person is part of P1J.
- It may be that they need to package together many different pieces of information. SFDU-may be useful in doing this.

Resolutions to MC

The Management Council resolves that

- The OAIS Agency review be extended to end with the ISO review
- The Data Entity Dictionary Specification Language – Abstract Syntax be published as a Red Book
  - PVL Concrete Syntax be published as a Red Book when ready
  - XML Concrete Syntax be published as a Red Book when ready
- EAST extension Red Book (pink pages) be published when ready

Conclusions/Issues

- Resources are scarce
- There is a great deal of interest/resources in the Archive work outside the space agencies
  - How best to leverage CCSDS effort?
    - Interdisciplinary International Coordination
- XML usage for metadata and more
  - RDL, XSIL etc
  - How best to ride this wave?
    - XML DEDSL
    - XML SFDU

Conclusions/Issues(2)

- Our “Uniqueness” is “LONG-TERM PRESERVATION” as an ISO standards (soon)
  - But the need is not unique to space
- Metadata Registration – practical experience
- Data description languages
- Relationship to CEOS/WGISS
- Relationship to IRTF
  - Internet Architecture WG seems inactive
  - Would it be sensible to try to set up a “long-term archive WG” as part of IRTF

How do we complement/ supplement the Global Information Infrastructure?

- GII needs permanent metadata archives
  - CA procedures applicable to overall management/preservation
  - OAIS applicable to preservation of information – including metadata
- GII needs more complex metadata capture and transfer
  - Data Description languages and techniques
  - “SFDU” CONCEPT dealt with these
    - XML SFDU-type implementation may open new applications
  - JAVA implementations build naturally onto SFDU ideas

GII Supplement (2)

- GII needs permanent Information Stores
  - OAIS forms the basis for this and we have the leadership on this
  - We can COORDINATE the effort available from non-space agencies
  - Certification is central to this
  - Ingest standards could have an immediate impact
    - for Space Agencies when applied to Mission Archives
    - Long-term archives

Resource Problems

- Ongoing probems
- Attempting to bring in resources on Archives from non-Space areas

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ATTACHMENT S

PANEL 3 REPORT

Panel 3 Presentation

PROGRESS REPORT TO

Technical Steering Group

Maurice Winterholer
P3 CHAIRMAN

Report to TSG, Noordwig October 21 1999

PANEL 3 Presentation outline

- General Status of Activities

- **Objectives / Organization**
- **Documentation structure / production**
- **Work Breakdown Structure/Active tasks**

- Work Progress since Newport (Workshop 23 & MC)

- **Work Plan & Documentation production modifications**
- **Achievements /changes**
- **Meetings past/planned**

- Conclusions/resolutions

PANEL 3 General Status of Activities

1. MAJOR OBJECTIVES MAINTAINED

WORK CONTINUED for :
- **SLE Service management recommendations production**
- **SLE Transfer Services recommendations production**

MORE EMPHASIS on the development of recommendation of mapping rules for the implementation of SLE services over existing Telecommunication systems (TCP/IP, CORBA…)

2. ORGANISATION slightly MODIFIED :

- **Working Groups WG1, WG2/3, WG5 MAINTAINED**
- **Working Group 4 STOPPED (*)**

(*)The corresponding work related to the identification and the structuring of various management parameter useful for the production and provision of the Transfer services is performed in WG 1

PANEL 3 Documentation Status

3. DOCUMENTATION Production

- global documentation tree maintained

- Service Management document READY for a RED issue in December 1999

- Transfer Service production

. basic return and forward services (RAF, RCF, CLTU, FSP) are ready to be issued as RED 2 versions, and will be be provided to Tom Gannett by end of October 1999

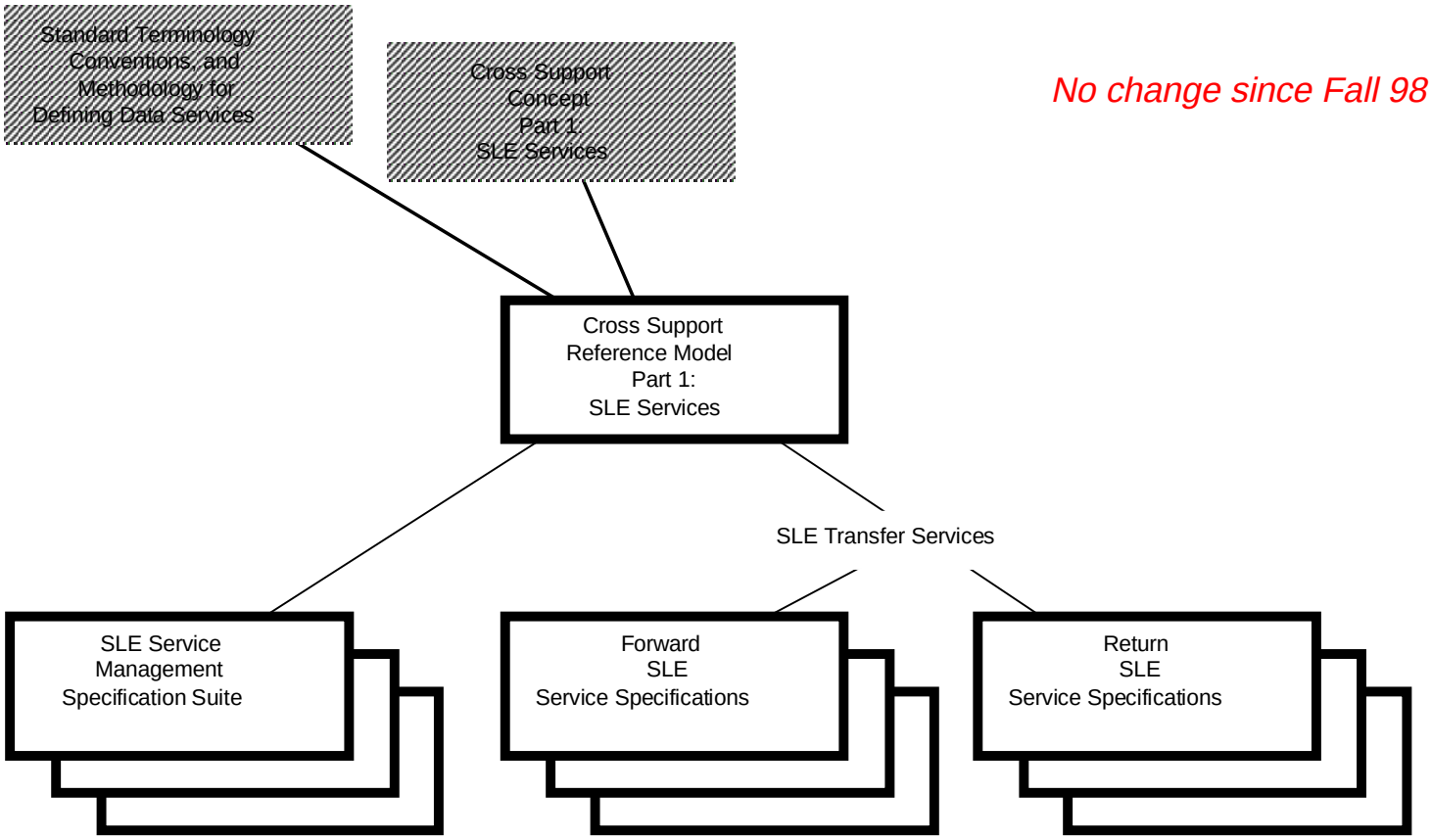
. The Limited (“lite”) Services versions (CLTU, RAF) are abandoned

. New combined books of the Transfer Services will be developed

- **Forward Services for December 1999**
- **Return Services for June 2000**

PANEL 3

Fall 99 SLE Documentation Tree



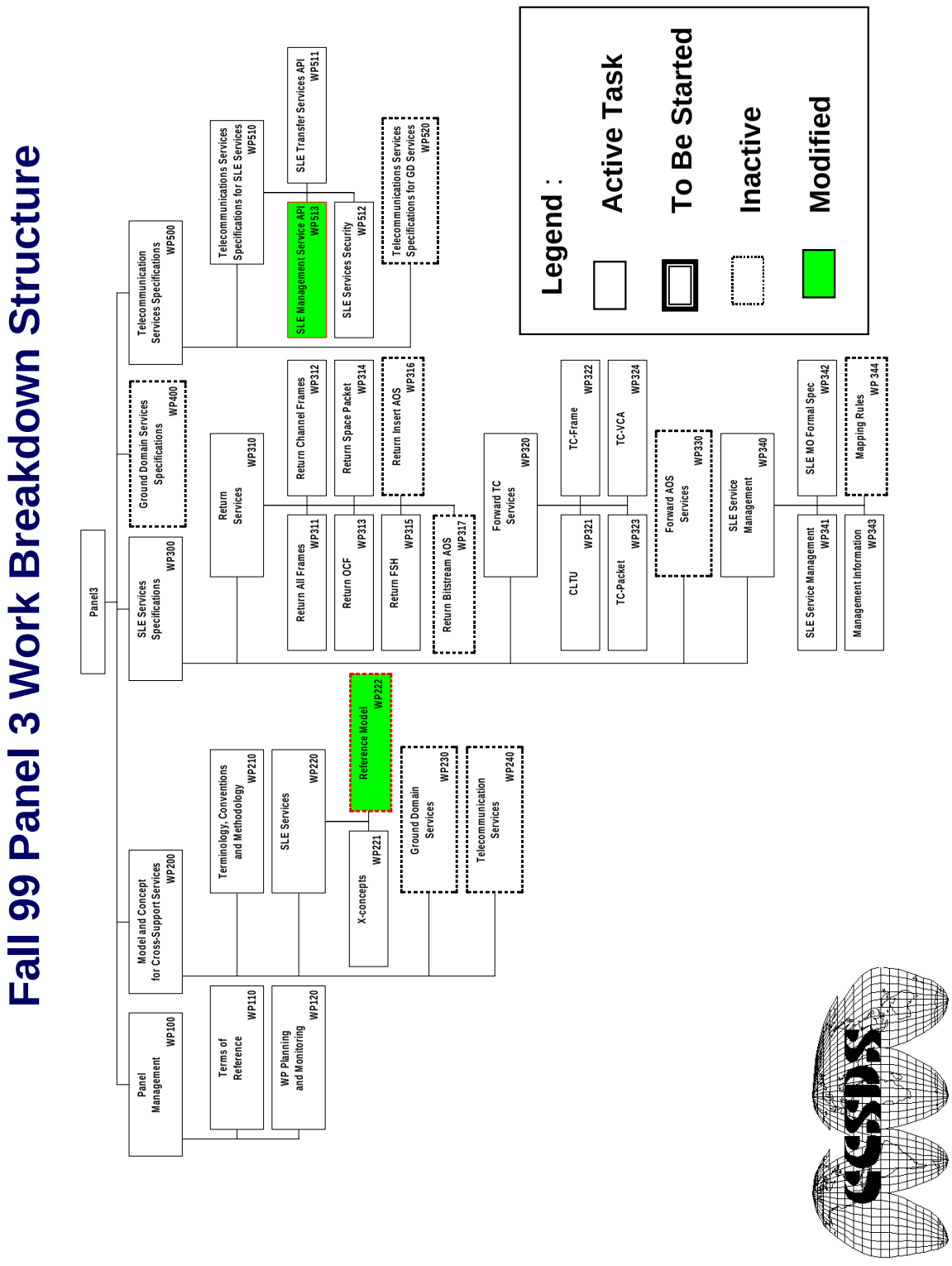
No change since Fall 98

Report to TSG Noordwijk October 21 1999 *Winterholer*

PANEL 3 Work Breakdown Structure Status

The Work plan was revised and updated at the P3 Workshop 23, in Darmstadt ,DE, October 11-15, 1999 .

Except of the deletion of WG4 specific Work Packages , no major Changes


Fall 99 Panel 3 Work Breakdown Structure
Panel3
Panel Management WP100
Terms of Reference WP110
WP Planning and Monitoring WP120
Model and Concept for Cross-Support Services WP200
Terminology, Conventions and Methodology WP210
SLE Services WP220
X-concepts WP221
Reference Model WP222
Ground Domain Services WP230
Telecommunication Services WP240
SLE Services Specifications WP300
Return Services WP310
Return All Frames WP311
Return OCF WP313
Return FSH WP315
Return Bitstream AOS WP317
Return Channel Frames WP312
Return Space Packet WP314
Return Insert AOS WP316
Forward TC Services WP320
CLTU WP321
TC-Packet WP323
TC-Frame WP322
TC-VCA WP324
Forward AOS Services WP330
SLE Service Management WP340
SLE Service Management WP341
SLE MO Formal Spec WP342
Management Information WP343
Mapping Rules WP 344
Ground Domain Services Specifications WP400
Telecommunication Services Specifications WP500
Telecommunications Services Specifications for SLE Services WP510
SLE Transfer Services API WP511
SLE Management Service API WP513
SLE Services Security WP512
Telecommunications Services Specifications for GD Services WP520
Legend :
Active Task
To Be Started
Inactive
Modified

PANEL 3 Fall 99 Work Package Status

WP ID	PACKAGE TITLE	STATUS
WP 110	Terms of reference	*closed / YB*
WP 120	WP Planning and monitoring	active
WP 210	TCM	*closed / GB*
WP 221	Cross Support Concept	*active / GB*
WP 222	SLE-Reference Model	in*active / BB*
WP 311	RAF Service Specification	active
WP 312	Return Frames (VC& MC)	active
WP 313	Return OCF (MC & VC)	active
WP 314	Return Space Packet	active
WP 315	Return FSH (MC& VC)	active
WP 321	CLTU Service Specification	active
WP 322	Forward TC Frame Specification	active
WP 323	Forward Space Packet	active
WP 324	Forward TC-VCA	active

active : WP under process
closed : WP achieved GB/BB/YB
waiting : WP not started

PANEL 3 Fall 99 Work Package Status

WP ID	PACKAGE TITLE	STATUS
WP 511	SLE application programming interface(2)	active
WP 512	SLE security framework (2)	active
WP 513	SLE Service Management API	active

,

(2) this work is done in WG5

____ *(underline identifies changes from WS21)*

PANEL 3 Fall 99 Documents production schedule

	Current	1999		2000			
TCM	Green						
CS Concept	Green				Green		
CS Ref Mod	Blue						
SLE Service Mgmt	White		Red		Blue		
SM MO GDMO	Draft	Draft	White	Red	Blue		
SM Mgmt Info			Draft	**White**	**Blue**		
SLE RAF	Red-1		Red-2	Blue			
SLE RCF(1)	Red-1		**Red-2**	Blue			
SLE FSP	Red-1		**Red-2**	Blue			
SLE FTCF(2)	White				Blue		
SLE CLTU	Red-1		Red-2	Blue			
SLE ROCF(1)	White				Blue		
SLE RFSH(1)	White						
SLE RSP(1)	White						
SLE TCVCA(2)	White						
Combined Return(1)	Draft			**White**	Red		
Combined Forward(2)			White	White	Red		
SLE Appl API		Draft	White-1	White-2	Red	Blue	
SLE User Auth.				Draft	White-1	White-2	Red
SLE Realization			Draft	White	White-2	Green	

Report to TSG Noordwijk October 21 1999 *Winterholer*

PANEL 3 WORK PROGRESS since Newport

- **Work Breakdown Structure Changes**

- **Documentation production**

  - **Documentation production before WS 23**
  - **Schedule changes**
    -

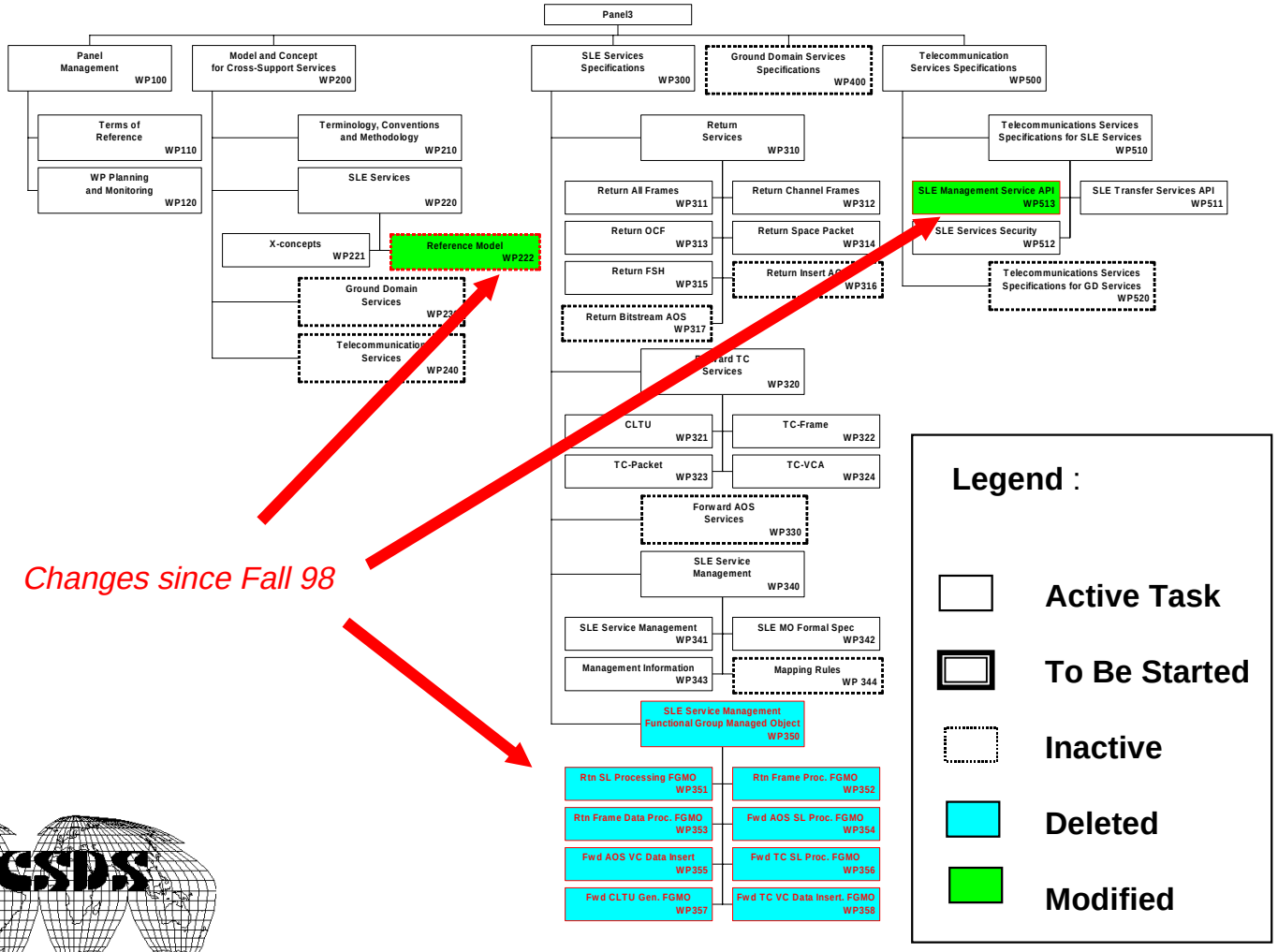
- **P3 Workshop #23 Achievements and changes**

  - **Technical briefings**
  - **Solving Documentation issues**
    - **RED issues production**
    - **combined services book drafting**
    - **SLE API recommendation development**

  - **CSP/COP comments**

- **Meetings Past/planned**

Fall 99 Panel 3 Work Breakdown Structure



PANEL 3 WORK PROGRESS since NEWPORT

The following SLE documentation were distributed **prior Darmstadt WS 23 :**

1. ***SLE Service Management (910.5-W-1.22) October 1999***
2. ***Return All Frames (911.1-R-1.7) September 1999***
3. ***Return Channel Frames RCF (911.2-R-1.7) September 1999***
4. Return OCF (911.4-Draft Red-1) October 1998
5. Return FSH (911.5-Draft Red-1) October 1998
6. ~~Return Channel Frame (911.6-W-1) July 1998~~ (combined with RVC)
7. Return Space Packet (911.7-W-1) August 1998
8. ***Forward CLTU Service (912.1-R-1 and 912.1-R-1-99c) October 1999***
9. Forward Telecommand Frame (912.2-Draft Red-1) May 1999
10. ***Forward Space Packet (912.3-R-1.9.2) July 1999***
11. Forward TC VCA (912.4-W-2) July 1998
12. Consolidated Return Services Specification (911-D-1) April 1999
13. ~~Management Parameters of SLE Services (CCS.REP.019-3) December 1998~~ (included in SLE SM)

PANEL 3 Fall 99 Documents production schedule

	Current	1999		2000			
TCM	Green						
CS Concept	Green				Green		
CS Ref Mod	Blue						
SLE Service Mgmt	White		Red		Blue		
SM MO GDMO	Draft	Draft	White	Red	Blue		
SM Mgmt Info			Draft	**White**	**Blue**		
SLE RAF	Red-1		Red-2	Blue			
SLE RCF(1)	Red-1	~~**Red-2**~~	**Red-2**	Blue			
SLE FSP	Red-1	~~**Red-2**~~	**Red-2**	Blue			
SLE FTCF(2)	White		~~**Red**~~		Blue		
SLE CLTU	Red-1		Red-2	Blue			
SLE ROCF(1)	White			~~**Red**~~	Blue		
SLE RFSH(1)	White			~~**Red**~~			
SLE RSP(1)	White			~~**Red**~~			
SLE TCVCA(2)	White			~~**Red**~~			
Combined Return(1)	Draft		~~**White**~~	**White**	Red		
Combined Forward(2)			White	White	Red		
SLE Appl API		Draft	White-1	White-2	Red	Blue	
SLE User Auth.				Draft	White-1	White-2	Red
SLE Realization			Draft	White	White-2	Green	

Report to TSG Noordwijk October 21 1999 *Winterholer*

PANEL 3 Panel 3 Workshop #23 Activities

1. TECHNICAL briefings related to LE transfer services and Management

- **authentication an Access Control of SLE Operations**
- **Building an d Executing a SLE Service Package**

2. DOCUMENTATION Production

- **Service Management document READY for a RED issue in Dec 1999**
- **basic return and forward Transfer Services (RAF, RCF, CLTU, FSP) are ready to be issued as RED 2 versions, and will be be provided to Tom Gannett by end of October 1999**
- **The Limited (“lite”) Services versions (CLTU, RAF) are abandoned**
- **Decision of development of a SLE application API blue book, based on existing Integral document**
- **New combined books of the Transfer Services will be developed**
  Forward Services for December 1999
  Return Services for June 2000

PANEL 3 Panel 3 Workshop #23 Activities

3. Current Work plan revision

- **Agreement on Work packages /No new activity started**
- **Current activities schedule updated**
- **Short term action items list assigned**

4. CCSDS Strategic Plan (CSP)

- **presentation of draft 4 (August)**
- **comments**

PANEL 3

MEETINGS of Panel 3

Past meetings

Workshop 16 in May 1-7 , 96 in PASADENA
Workshop 17 in November,4-8 , 96 in OBERPFAFFENHOFEN
Workshop 18 in May 19-23, 97 in SILVER SPRING
Workshop 19 in November 3-7, 97 in VILLAFRANCA
Workshop 20 in May 4-8, 98 in HOUSTON
Workshop 21 in Oct 26-30, 98 in DARMSTADT
Workshop 22 in May 07-12, 99 in NEWPORT
Workshop 23 in Oct 11-15, 99 in DARMSTADT

2 intermediate meeting for WG1 in 1999 before Darmstadt WS23
July in Paris
September in Washington

Future meetings

- ***Next P3 Workshop "24" : June 13-17 2000 in Toulouse (CNES)***

- ***Intermediate WG meetings in 2000 To be confirmed***
  probably one or 2 meetings

PANEL 3

CONCLUSIONS/RESOLUTION :

- Excellent progress

- Petition the MC in December for issuing the SLE Service Management as RED

- decision of opening a specific WEB site for the period of review of SLE Service Management document

- New Red books for Transfer Services

- Good synergy with INTEGRAL Project

Thanks to ESA for the hosting of P3 WS23

Report to TSG Noordwijk October 21 1999 *Winterholer*

PANEL 3 ANNEXES

ORGANISATION :

Working Group definitions

Tasks allocations diagram

DOCUMENTATION :

detailed changes to SERVICE MANAGEMENT RELATED DOCUMENTS

PANEL 3 Fall 99 Panel 3 Organization

The Working Group structure was updated in Houston, May 1998

No significant change

WG 1 : responsible for WP 210 (TCM), WP 220 (SLE Services Models and Concepts) and WP340 (SLE Management). This group maintains the :

1. **TCM** - *existing Green Book No change needed*
2. **Cross support Concept** - *existing Green Book revision needed*
3. **SLE Reference Model documents** - *existing Blue Book revision needed*
4. **SLE Service Management Specification** - *existing ; RED in Fall 1999*
5. **SLE Managed Object Formal Specifications** - *existing draft*
6. **SLE Service Management Information File Specifications**
   - **6.1** SLE SM Spacecraft Characteristics
   - 6.2 SLE SM Data Channel Tree
7. **SLE SM Authentication and Access Control**
8. **SLE SM Implementation Mapping Rules**

Lead of WG1 : Fred BROSI (NASA/GSFC)

Report to TSG Noordwijk October 21 1999 *Winterholer*

PANEL 3 Fall 99 Panel 3 Organization

WG2 : responsible for the WP310 (SLE Return Services Specifications). This group develops the detailed specifications for the SLE Return Services, according to SLE Reference Model and Service Management Specification documents, with the following priorities :

1. **Return All Frames (RAF) -** *existing RB (July 98),* ***new RB-2 in fall 99***
2. **Return Virtual Channel Frame (RCF) -** *existing RB (July 98****), new RB-2 in fall 99***
3. **Return Master/virtual Channel (ROCF) -** *existing WB (Oct 98)*
4. **Return Master/virtual Channel FSH (RFSH) -** *existing WB (Oct 98)*
5. **Return Space Packet (RSP) -***existing WB (July 98)*

Lead of WG2 : Martin Pilgram (DLR)

WG3 : responsible for the WP320 (Forward Tele command Services Specifications). This group develops detailed specifications for the SLE Forward Tele command Services according to SLE Reference Model and Service Management documents, with the following priorities :

1. **CLTU** - *Red version reviewed by Agencies April 98,* ***new Red 2 fall 99***
2. **Tele command frame -** *existing WB (April 98);*
3. **Forward Space Packet - new** ***RB2 (July 99)***
4. **Tele command VCA -** *existing WB (July 98)*

Lead of WG3 : Martin Pilgram DLR)

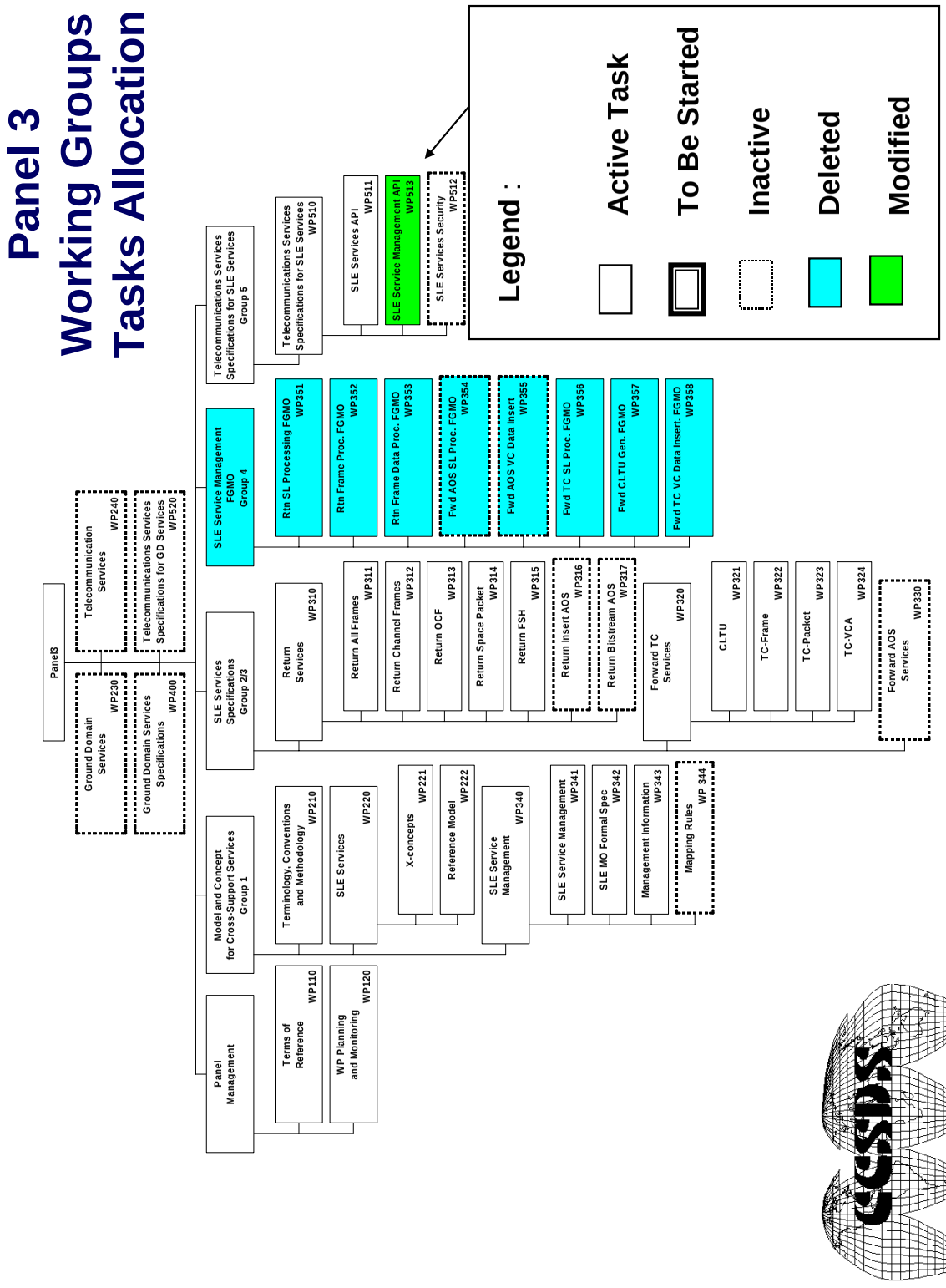
PANEL 3 Fall 99 Panel 3 Organization

WG 5 : responsible for WP 510 (Telecommunication services for SLE services especially for WP 511 (SLE API) and WP 512 (SLE Services security)).
This group will :

- **Specify a recommended application programming interface (API) for applications to interface to the SLE service element**
- **Select appropriate safeguarding techniques for user authentication and data object protection to support implementation of the SLE services**
- **Select a suite of available standard communication and related services and protocols to support implementation of the SLE services**

It initially addresses SLE-API and SLE security framework. Later it will expand to include additional other communications aspects (e.g., transport, "middleware," directory services)

Lead of WG5 : Michael Stoloff (NASA/JPL)


Panel 3
Working Groups
Tasks Allocation
Panel3
Panel Management
Model and Concept for Cross-Support Services Group 1
Terms of Reference WP110
WP Planning and Monitoring WP120
Terminology, Conventions and Methodology WP210
SLE Services WP220
X-concepts WP221
Reference Model WP222
SLE Service Management WP340
SLE Service Management WP341
SLE MO Formal Spec WP342
Management Information WP343
Mapping Rules WP 344
SLE Services Specifications Group 2/3
Return Services WP310
Return All Frames WP311
Return Channel Frames WP312
Return OCF WP313
Return Space Packet WP314
Return FSH WP315
Return Insert AOS WP316
Return Bitstream AOS WP317
Forward TC Services WP320
CLTU WP321
TC-Frame WP322
TC-Packet WP323
TC-VCA WP324
Forward AOS Services WP330
Ground Domain Services WP230
Telecommunication Services WP240
Ground Domain Services Specifications WP400
Telecommunications Services Specifications for GD Services WP520
SLE Service Management FGMO Group 4
Rtn SL Processing FGMO WP351
Rtn Frame Proc. FGMO WP352
Rtn Frame Data Proc. FGMO WP353
Fwd AOS SL Proc. FGMO WP354
Fwd AOS VC Data Insert WP355
Fwd TC SL Proc. FGMO WP356
Fwd CLTU Gen. FGMO WP357
Fwd TC VC Data Insert. FGMO WP358
Telecommunications Services Specifications for SLE Services Group 5
Telecommunications Services Specifications for SLE Services WP510
SLE Services API WP511
SLE Service Management API WP513
SLE Services Security WP512
Legend :
Active Task
To Be Started
Inactive
Deleted
Modified

PANEL 3

Changes to SM Related Documents

- **Re-named Spacecraft Channel Tree:**

  SLE Service Management Data Channel Tree

- **Re-named Spacecraft Characteristics:**

  SLE Service Management Spacecraft Characteristics

- **Added:**

  SLE Service Management Authentication and Access Control

  (Separate GDMO Specs accompany the above documents)

- **Eliminated:**

  S/C Trajectory Prediction Format book

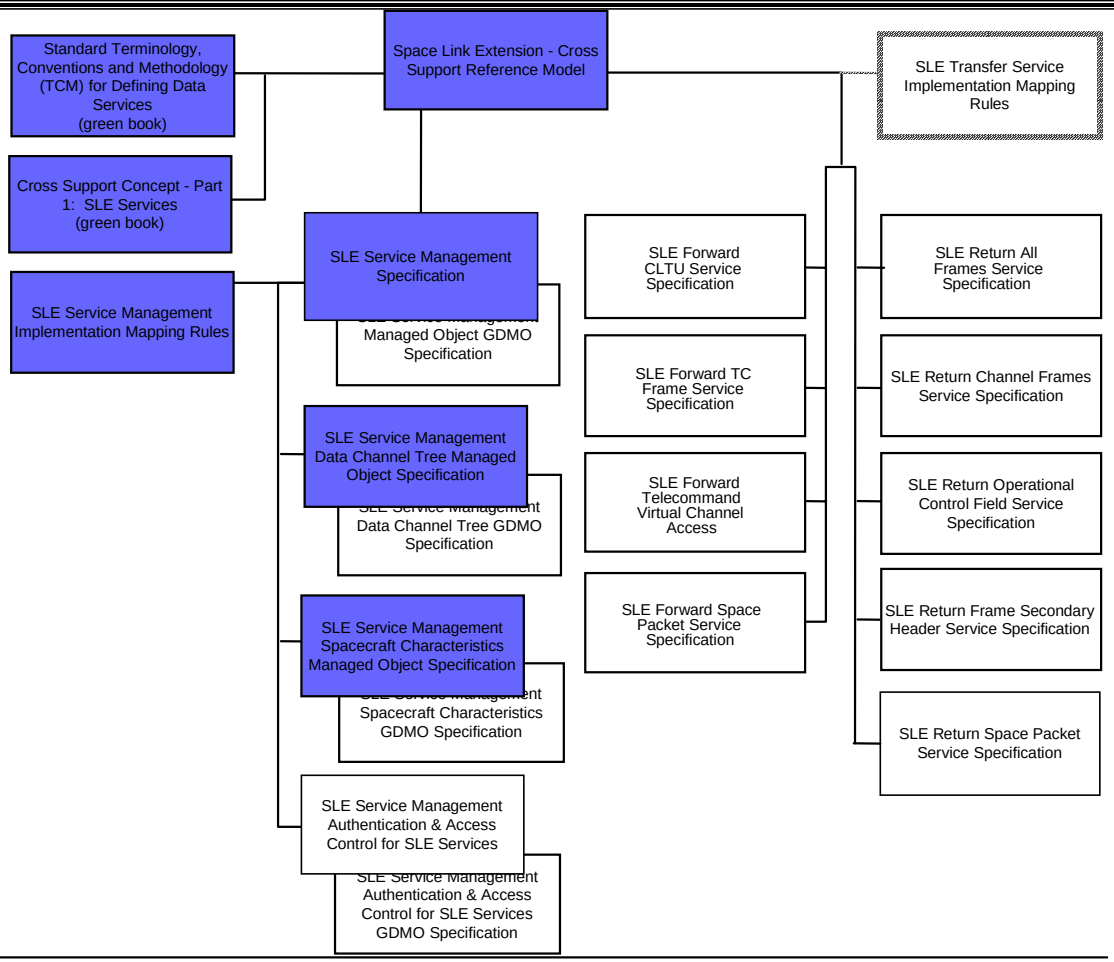
  - **Format will be mutually agreed upon before execution**
  - **Therefore, document not necessary**

PANEL 3

Changes to SM Related Documents

SLE Document Tree

Internal View



ATTACHMENT T

TSG REPORT

TSG Meeting No 17 in Noordwijk, 21st October 1999

Participants:

Allan, Peter	BNSC
Brosi, Fred	GST (NASA)
Gannett, Thomas	GST (NASA)
Giaretta, David	BNSC/RAL
Hooke, Adrian	NASA/JPL
Lenhart, Klaus	ESA/ESOC
Maeusli, Damien	ESA/ESTEC
Ortega, Guillermo	ESA/ESTEC
Peccia, Nestor	ESA/ESOC
Shave, Nick	LOGICA (BNSC)
Winterholer, Maurice	CNES
Yamada, Takahiro	ISAS

Agenda:

1. Approval of Agenda
2. Approval of Minutes)
3. Report on Panel/Sub-Panel progress
4. Review of Actions
5. Information on Technical Progress (11:00)
5.1 Results of Ad Hoc WG on Security
5.2 Status of work of Naming and Addressing WG
5.3 On-board navigation and S/C timekeeping
5.4 Space Link Reference Model, Status report
5.5 NASA Report on the Interplanetary Internet
5.6 Review of CCSDS Strategic and Operating Plan
7. Planning of the next TSG Meeting
8. Actions
End of TSG Meeting, general part

Special Meeting on CCSDS future strategy

Problem of congestion in the frequency band allocated to space research

There is some urgency now to agree on a (a set of) recommendation(s) because some bands are getting more and more congested giving rise to more frequent conflicts. The situation is even made worse by the pressure from the Mobiles Community on the band most widely used by the agencies for space communications, the S-band. The problem was recognised by the SFCG which adopted a recommendation on a spectral mask that the CCSDS agencies will only be able to meet with one of the new modulations currently in the selection process. Therefore work on bandwidth-efficient Modulation schemes and Coding has to be treated with priority.

Issue of licenses/patents

in this case for newer bandwidth-efficient methods, namely GMSK Vs FQPSK and similar modulations. It is important for the agencies to agree on schemes, which are license free - at least for the research environment.

Recommendation ready for Agency review, Rec. 3.3.5A

A resolution concerning a statement vis-à-vis SFCG liaison was issued to be approved

Information on Technical Progress

Results of Ad Hoc WG on Security

Mr. N. Shave gave the presentation on the status of the Ad Hoc WG. (Analysis of threats to civil space missions). The presentation is attached to the minutes. Space mission uniqueness is no longer a protection. Currently military security is high, but it is different with civilian missions, e.g. for NASA missions there is some degree of security e.g. ISS, for ESA missions an authentication part of Packet TC is foreseen, but not used by any missions. The study analysed the process and identified generic threats and evaluated various mission scenarios including mechanisms to counter threats (active and passive ones). Mr. Shave gave also an alarming example of possible threats: The hacker community have apparently satellites as one of their targets. (The hacker Internet report mentions even the conformance with CCSDS recommendations for TC.)

See http://www.hackernews.com (Security Analysis of Satellite Command and Control Uplinks).

Several recommendations were made, which were supported by TSG participants:

Panels must examine security implications
Books should not be approved without security analysis
P1A security GB expanded to cover P2 and P3
Need for a generic CCSDS Space Mission System Policy
Need for more resources to cover the security aspects

ACTION TSG-99-12: TSG chairman to raise the security issue with MC.

Status of work of Naming and Addressing WG

Mr. N. Peccia presented the results of the WG. A document on naming conventions was circulated. See A30.0-Y-01. (attached or on server)

Note that ESA CAOS system needs to be changed to include prefix (1.3.112.4.2) to identify ADID namespace, and other prefixes for e.g. P3 SLE Services Identifiers namespace. This will allow ESA CAOS to be used by other groups. The panel 1 chairman asked for name space for P1 related objects as was defined for P2 and P3.

On-board navigation and S/C timekeeping Situation was briefly discussed also in context of agenda point 3 (navigation subpanel report).

Mr. Hooke mentioned, already there are several s/c interfacing with a GPS receiver. How should this be standardized, including interfaces to O/B navigation processing and O/B clock synchronisation, and time code tagging of packets info. Possibly one should consider to move timecode work into SOIF WG.

ACTION TSG-99-14: P1J and SOIF to cooperate on the issue of onboard timing aspects.

Space Link Reference Model, Status report

T. Yamada gave the status report and presented the results and current issues in restructuring the CCSDS link layer recommendations. (The presentation is attached).

NASA Report on the Interplanetary Internet

A. Hooke summarised the status of the current activities. The presentation can be downloaded from the Internet (URL: www.ipnsig.org). The subject will be covered in more detail in the future CCSDS strategy meeting and at the next MC meeting.

1. Review of CCSDS Strategic and Operating Plans

Mr. T. Gannett presented the results and the status of the review of the issue 4 of the CCSDS Plans. (Presentation attached), Several changes were suggested. The Operating Plan was concluded to contain the overall future activities from which the actual detailed work plan would be derived including ongoing activities. Modified draft version 5 will be issued November. Aim is to sign off in December 1999.

New Actions

Note : action due date is by next TSG meeting unless specified other wise

ACTION TSG-99-10: G. Ortega will send mail with URL for documents (copy of draft GB documents) for P2 review before Nov 2 in time for the P2 meeting to discuss the proposed formats.

ACTION TSG-99-11: P2 to discuss navigation formats at Panel meeting and suggest - if required -modifications.

ACTION TSG-99-12: TSG chairman to raise the security issue with MC. (Next MC meeting, Dec 1999)

ACTION TSG-99-13: TSG chairman to try to get ESA and CNES to provide resources to continue study and security risk analysis.

ACTION TSG-99-14: P1J and SOIF to cooperate on the issue of onboard timing aspects.

ACTION TSG-99-15: T. Gannett: Issue draft 5 of CCSDS Plans by November 1999.

In order to ensure consistent use of the WBS within the COP it was suggested and agreed to use from Microsoft the Organisation chart SW.

ACTION TSG-99-16: Panels to use same SW for Work Break Down Structure in the CCSDS Operating Plan.

ACTION TSG-99-17: All participants of MC meeting to be prepared to review and discuss the CCSDS Plans. (By next MC meeting)

Panel Meetings planned (in spring 2000)

For the next round of meetings, P1 plans to meet in the May timeframe in the US (1A, 1E, 1F, 1J, SIOF and combined meetings plus a P1 plenary), P2 will decide the meeting place and time at its meeting in November in Villafranca. P3 will meet in June in Toulouse, before the SpaceOps 2000 conference.